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BIENNIAL REPORT

Wildlife

JULY 1, 1970
JUNE 30, 1972

Wildlife IN NORTH CAROLINA
JANUARY, 1973

State of North Carolina

Wildlife Resources Commission

RALEIGH, N. C. 27611

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His Excellency, The Governor of North Carolina
The Honorable Members of the General Assembly
Raleigh, North Carolina

Dear Sirs:

We are pleased to submit to you the Wildlife Resources Commission's 13th Biennial Report for the period July 1, 1970 to June 30, 1972. Your support of the important programs of wildlife conservation and boating safety is greatly appreciated.

The Commission and staff hope you will share their feeling that this has been a period of progress made possible by team work with your offices, other governmental agencies, private organizations and individual citizens.

We shall continue to strive for further improvements and welcome your suggestions and advice.

Respectfully yours,

Robert G. Sanders

Robert G. Sanders, Chairman
Wildlife Resources Commission

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AND WATER SAFETY

WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 102,100.

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 1 JANUARY, 1973

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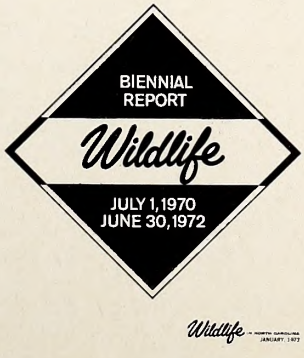
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



The yellow and black WILDLIFE diamond on our cover this month announces that this is our biennial report issue for the period July 1, 1970, through June 30, 1972. This distinctive emblem is used frequently by the Wildlife Resources Commission as a shoulder patch, boating access area sign, boundary line marker around game lands, and in many other ways. We hope that when you see such a sign you will remember the organization behind it, the Wildlife Resources Commission: your state agency working to provide you with better hunting and fishing through sound wildlife management.

THE COMMISSION

PHOTO BY JIM DEAN

The nine-member Commission met 16 times during the biennium to consider the many important matters affecting the management of North Carolina's wildlife resources and the boating and hunter safety programs.

ON June 30, 1972 the Wildlife Resources Commission had completed 25 years of service to the people of North Carolina. During this quarter of a century, the Commission was self-supporting, deriving most of its operating funds from the sale of licenses and from motorboat registration. This revenue has been supplemented each year by Federal Aid funds through apportionment of a share of the excise tax on sporting arms, ammunition, and sport fishing tackle. An additional supplement began in 1959 when 1/8 of 1 percent of North Carolina's gasoline fuel tax was appropriated for the purpose of promoting boating safety on the waters of the State. The Commission is not supported by general taxation and gets no monies from the General Fund.

Since its establishment in 1947, the Commission has accomplished its objectives through the application of a five-point program—Regulation, Enforcement, Education, Management, and Research. From time to time, this program has been modified to meet current demand.

The name Wildlife Resources Commission refers to both the nine-member policy-making board appointed by the Governor, and the agency consisting of an Executive Director appointed by the Commission, and the personnel employed by him to accomplish the work of the Commission.

The Commission (board) held 16 official meetings during the 1970-72 biennium. A primary consideration at these meetings was the adoption or modification of regulations governing hunting, fishing, trapping, or boating. However, policies were considered and established relative to other phases of the five-point program affecting application and enforcement of regulations; education of the public regarding wildlife, hunter and boating safety; management of fish and wildlife, and research to determine better methods of improving wildlife populations. Some of the more important actions during the biennium were:

- Adopted immediate goals for the improvement of public relations and approved a long-range plan to accomplish these improvements.
- Established a policy approving, in principle, (1) the development of the fish farming industry in North Carolina; (2) considering non-game food fish reared in privately-controlled ponds to be an agricultural product not subject to catch, possession, nor license restrictions applicable to inland fishes in general; (3) prohibiting fish farming in inland fishing waters other than in ponds completely subject to private control; and (4) agreeing to furnish advice and assistance on fish farming only as that activity affects other wildlife resources, and only as time permits Commission personnel to do so after the completion of their regularly assigned duties.
- Approved reorganization of the divisions of Game, Inland Fisheries, Protection and Motorboats and Water Safety to provide for: (1) Implementation of a new Game Lands program; (2) restructuring the Division of Game to better fit its present functions; (3) expansion and improvement of overall efficiency of the Division of Protection by assigning to it responsibility for all law enforcement functions of the Commission; (4) implementation of a new Federal Aid program of hunter safety training in the Division of Protection; (5) establishment of a Boating Safety Programs Coordinator who will maintain contact with local water safety committees and other boating groups, prepare a short course in boating safety for use in public schools, keep current the Commission's publications on boating safety, and develop a boating safety film library; (6) establishment of a Boating Facilities Supervisor who would provide on-the-job supervision for the engineering employees in the field and assume responsibility for supervising snagging and construction crews; and (7) establishment of an additional snagging crew to help meet the increased demands for waterway clearance for navigation.
- Instructed staff to take all appropriate measures to assure that suitable freshwater habitat will be maintained in Currituck Sound with a view to preserving this important public resource.
- Prepared and adopted a budget for the next biennium.

ADMINISTRATIVE SERVICES

Internal operations of the Commission such as licensing, registration of motorboats, revenue collecting, budgeting, disbursing of funds, accounting, auditing, data processing, and warehousing are administrative services and were performed during the biennium by a staff of clerical and office personnel headquartered in Raleigh.

Revenue Collection

Licensing

The principal source of the Commission's operating funds is the sale of hunting, fishing, and trapping licenses. During the biennium more than 1,000 license agents were authorized to sell licenses for the Commission. These agents were selected from the business community and handled the Commission's licenses on a consignment basis, making reports and remittances monthly to the License Section of the Commission.

Revenue from the sale of licenses and permits increased from $3,954,180.11 for the fiscal year ending June 30, 1971 to $4,065,698.91 for the fiscal year ending June 30, 1972.

Motorboat Registration

During the biennium, Certificates of Number were issued to owners of boats powered with motors of over 10 horsepower.

For the calendar year ending December 31, 1970, the Commission registered 76,239 boats, and for the calendar year ending December 31, 1971 there were 82,983 boats registered. In addition to original registrations, there were numerous requests for duplicate registration certificates and transfer of ownership certificates processed by the Commission.

The revenue to finance registration and boat numbering came primarily from fees charged boat owners for the service. An additional source of revenue, used largely for the promotion of boating safety and public access to the waters of the State, came from allocation to the Commission of one-eighth of one percent of the gasoline fuel tax collected by the State.

Federal Aid to Fish and Wildlife Restoration and Hunter Safety

During the biennium, the Commission secured Federal Aid funds to help finance its fish, game, and hunter safety projects. These funds came to the Commission as a result of reimbursement for State expenditures on federally-approved projects.

For the fiscal year ending June 30, 1971, the Commission received $707,485.74 in federal funds, and for the fiscal year ending June 30, 1972, the Commission received $1,231,158.27 from this source.

Miscellaneous

Other revenue during the biennium consisted of receipts from the sale of timber from Commission-owned game lands managed for wildlife and timber production, and from the sale of educational publications such as WILDLIFE IN NORTH CAROLINA, the Commission's official magazine.

General Accounting

The Commission draws upon three special funds to finance its operation. The first is the Wildlife Fund established by the Wildlife Resources Act of 1947. This fund finances all operations and capital improvements relating to wildlife. The second fund is the Motorboat Fund established by the Boating Safety Act of 1959. This fund finances all operations and capital improvements relative to motorboats and boating safety. The third fund, the Capital Improvement Fund, draws upon the other two and is used for financing land acquisition for game and for boating access, and for development of these lands.

During the biennium, the Commission's Accounting Section processed and audited invoices, prepared vouchers, and compiled reports for the use of the Executive Director and staff for management and planning purposes.

Personnel

Personnel services performed during the biennium included the processing of applications for employment; the preparation of requests to the Personnel Department for employment of qualified applicants, changes in employee classification, salary and salary grade, the granting of

• **continued on page 30**

Revenue collecting and disbursement of funds required utmost care and precise use of modern accounting equipment. The sportsman's license dollars were carefully budgeted and spent.

PHOTO BY REX GARY SCHMIDT

DIVISION OF PROTECTION

THE work of the Division of Protection during the biennium continued to include a wide variety of activities, the primary one being enforcement of the fish, game and boating laws. In accordance with the Commission's policy of fairness and impartiality, the division pursued its law enforcement program with vigor against those who wilfully robbed the honest hunter and fisherman of his wildlife resources. Likewise, the boaters who wilfully or carelessly showed a disregard for the lives, property, and welfare of others were the target of special efforts. The Commission continued to strengthen and increase the effectiveness of the division during the past two years.

The Division of Protection is now responsible for wildlife enforcement activities on all land throughout the state including game lands. This move was designed to provide a strong, efficient, improved supplement to the law enforcement effort everywhere under the direction of this division with special attention to game lands.

Personnel

Twenty-two new positions were added to the division during the biennium—19 men were transferred from the Division of Game to the Division of Protection for full-time law enforcement work and three Hunter-Safety Officer positions were created. The total strength of the division is now 190, of which 188 are enforcement officers and two are clerical. Of the 190 personnel, four are administrative and 186 are field personnel.

Training

The division continued to place emphasis on careful selection and thorough training of its personnel. Through the use of the instruction and facilities made available by the Institute of Government at the University of North Carolina, training consisted of a three-week pre-service school, and one two-week and two one-week in-service schools, for a total of seven weeks of training.

Hunter-Safety Program

A review of the Hunter Safety program conducted by the North Carolina Wildlife Resources Commission prior to July 1971 indicated that while many young people had been trained in hunter safety, there was a need to analyze and upgrade the program.

For many years the Commission has been presenting hunter safety programs on a limited basis, but as of January 1972 a special group of officers was assigned to administer this program by utilizing Wildlife Commission personnel and qualified volunteers who could teach hunter safety to young people and adults.

To facilitate the needed improvements and to assure statewide coverage, the State was divided into three regions, with each region being made up of three of the established wildlife districts. A hunter safety officer, working directly under the Assistant Chief of the Division of Protection, was appointed to each of these regions. These three uniformed officers are required to

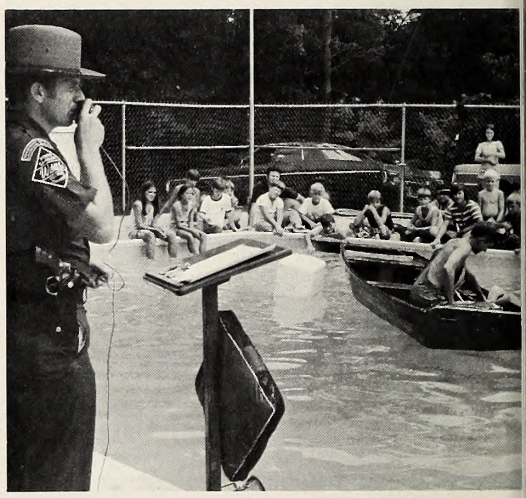


PHOTO BY TED DOSSETT

A reorganized and upgraded hunter safety training program (above, left) was the responsibility of the Division of Protection. Boating and water safety demonstration teams gave programs (above, right) to thousands of people of all ages. Division officers checked over 770,000 hunters and fishermen (below).

PHOTO BY REX GARY SCHMIDT

maintain their residence in a central location of their assigned geographic region and are charged with the responsbility of training volunteer instructors and students, investigating hunting accidents, publicity of the hunter safety program, public relations including radio, TV, news releases and field demonstrations, and the keeping of records connected with the program.

Equipment

Additional and more modern equipment, suitable for accomplishing the division's assigned tasks, was acquired during this biennium. All officers of the division were assigned motor vehicles specially designed and equipped to meet the heavy-duty needs of enforcement work. Each officer has been furnished with a new .357 magnum pistol.

The Police Information Network (PIN) terminal, installed in the division in January 1972, has proven to be a useful means of communication as well as a valuable source of information. Access to the computerized files containing the records of about three million registered drivers has aided our officers in identification. Message switching with other terminals has been an aid to our officers when requesting information regarding boat registrations, license information, and other data.

A Recordak Lodestar Reader, equipped to provide motorboat registration information on microfilm, was installed in the division in 1971. Within minutes, this information can be obtained, transmitted by radio, telephone, or via PIN terminal to officers throughout the State or nation.

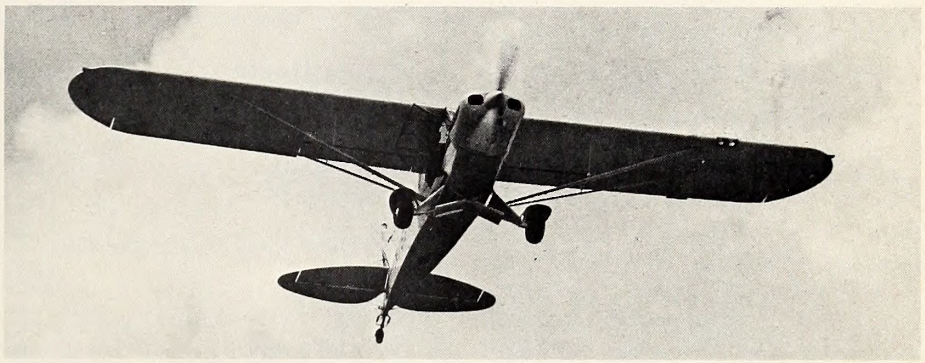
Field Operations

The following tabulation will show the extent and magnitude of the division's enforcement activities during the biennium.

	Biennium 1970-72
Number hunters and fishermen checked	772,947
Number violations	20,697
violation rate	2.68%
Number convictions	19,983
conviction rate	96.55%
Number boats checked	184,723
Number violations	5,985
violation rate	3.24%
Number convictions	5,700
conviction rate	95.24%

Summary

The additional personnel, newer, better and specialized equipment, and improvement of the hunter safety program, which is designed to give North Carolina complete coverage in this field, have increased the division's effectiveness and efficiency. The division will strive to continue its function of providing North Carolina with a fish, game and motorboat enforcement program that will be held in high esteem by the public.



The use of aircraft continued to prove very effective in wildlife law enforcement. Wildlife officers were equipped with the most modern transportation means on land, in the air, and on the water (below). A statewide radio communications system was supplemented by field radio units.

PHOTO BY REX GARY SCHMIDT

DIVISION OF INLAND FISHERIES

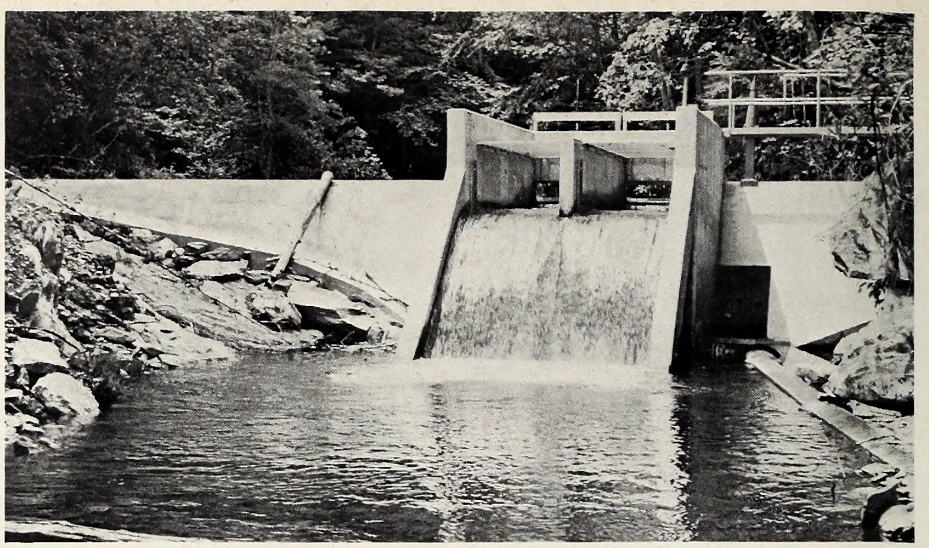


PHOTO BY RON KLAUDA

New facilities, such as Basin Creek water intake structure, will provide quality water to a new trout hatchery in northwestern North Carolina in Wilkes County.

IN order to attain its primary objectives of improved fishing, the Division of Inland Fisheries continued its program of research, management, fish production and investigation during the biennum. Emphasis continued on the study of the various fish and their habitats, statewide, to discover factors limiting the production of these fish, and to place into action management procedures designed to provide better fishing and an improved aquatic environment.

Hatchery Production

A self-cleaning dam and a 24-inch pipeline were completed for the new Basin Creek Hatchery near McGrady in Wilkes County. Preliminary plans for the construction of 25 concrete rearing raceways and five nursery raceways, seven 30-foot in diameter circular pools, hatchery, food storage, garage and office buildings, and residence provisions for the personnel at the new Basin Creek Hatchery are being developed.

Research and diagnostic facilities at the pathology lab located at the Armstrong Creek Hatchery were expanded to include fish viral disease studies.

Experiments were initiated at the Marion and Table Rock hatcheries to develop intensive and extensive rearing techniques for striped bass and muskellunge fry and fingerlings. Muskellunge fry were obtained from the Pennsylvania Fish Commission in exchange for striped bass fry from the Weldon Hatchery.

A second series of experiments designed to evaluate five commercial trout diets were initiated in the spring of 1972 at the Marion Hatchery. The purpose of the experiments is to determine the most efficient trout diet particularly in relation to brood stock reproductive capacity. An earlier series of dietary experiments were prematurely terminated by accidental losses due to heavy rains.

Small Lake Management

The small lake management program initiated in the late 1960's on state-owned lakes has continued to expand and now encompasses municipal-owned water supply lakes. The division has cooperative agreements with 28 municipalities to manage the fishery resources of their lakes. The majority of these municipal lakes are clustered in the Piedmont area of North Carolina where the amount of public fishing water is at a minimum and the population density is at a maximum. With this combination of factors plus the ever-increasing fishing pressure, on public waters, sport fishermen have found a partial answer to their fishing desires in municipal water supply lakes. Unfortunately, the fishery resources of these lakes are of secondary importance and were never managed for intensive fishing pressure; fishing success, therefore, developed on a minimal level.

In conjunction with municipalities, the division initiated programs to enhance the level of

The objective of the Division of Inland Fisheries is to reduce the time between bites! Management of small lakes for better fishing is an effective way of accomplishing this objective.

PHOTO BY TOM ROLLINS

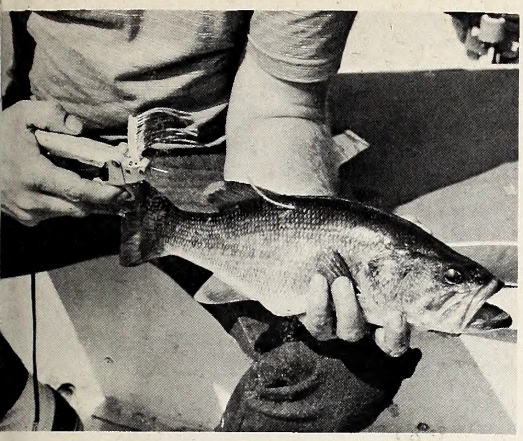


PHOTO BY REX SCHMIDT

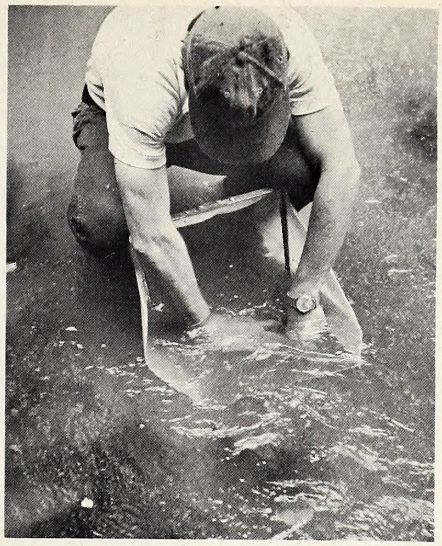


PHOTO BY LARRY BIRCHFIELD

Tagging fish and releasing them for later identification is helpful in determining migration habits, population densities and harvest rates, all necessary for effective fish management. Right, the abundance of aquatic insects is a basic factor in determining the quality of a stream.

fishing success. Although strict regulations governing water supply lakes precluded the use of several fishery management tools and techniques, preliminary sampling indicated the fish populations needed additional food and cover.

During the past biennium, threadfin shad introductions were continued and even expanded. Results of these forage introductions are just now being realized in the form of larger size crappie for the sports fisherman.

Cover in the form of old automobile tires (fish attractors), have been placed in most of the lakes under management. In some instances, increasing the cover was not necessary for the fish populations. However, "fish attractors" were placed in the lakes to benefit anglers.

Marked locations of "fish attractors" present anglers target areas of concentrated fishes, where hopefully the time between bites is shorter, which is what we started out to do

Reservoir Management

Large reservoirs are difficult to effectively manage simply because any fishery management practice must be conducted on an immense scale. The Division of Inland Fisheries is therefore limited to programs with available financing and manpower which are not in conflict with the lake's primary utilization. However, attempts to improve reservoir fisheries are worthwhile, since these bodies of water probably support the heaviest fishing pressure in North Carolina.

Reservoir fisheries management procedures are generally limited to stocking of new species, control of over-abundant species, water level manipulation, and publicity to increase harvest. The lower Yadkin-Pee Dee and Catawba River reservoirs are characterized by the presence of abundant numbers of all sizes of threadfin and gizzard shad acting as an ideal forage supply. Past introductions of white bass were successful and present management attempts have taken the direction of further predatory fish introductions.

Striped bass have been introduced in Norman and Badin lakes and walleye in Lake Tillery. The striped bass stockings are expected to provide a "put, grow, and take" fishery. During the first six months of a creel census conducted on Badin Lake in 1972, striped bass were found to contribute up to one percent of the total poundage of fish harvested, as revealed from 2,800 anglers interviewed. Limnological and fish populations surveys are either being taken or planned to evaluate the striped bass stockings on Badin Lake and white bass stockings on Gaston Lake.

These data are being collected in cooperation with the Reservoir Committee of the Southern Division, American Fisheries Society, to determine ecological factors that may influence success of predator fish introductions, and to evaluate their effects on the existing fish population and sport fisheries on warm-water reservoirs. Other reservoir management being conducted includes threadfin shad stocking to provide forage in several large reservoirs in the mountains and coastal regions.

Trout Management

Trout fishing in the mountains of western North Carolina has become increasingly popular in recent years, and a primary activity of the division has been to manage the 2,160 or so miles of streams (not including National Park or Cherokee Reservation waters) open to public fishing. Approximately 1,200 miles of this water is open to fishing through agreements with private landowners, and these streams are stocked regularly with yearling trout from federal and state hatcheries, and/or with fingerlings when they are available. Streams in this category are under "General Trout" regulations which allow a creel limit of seven fish with no size or bait restrictions.

An additional 960 miles of streams are on game lands—these are lands owned by the public or under long-term lease by the state, and streams are or will be intensively managed to provide quality trout fishing. The game lands program is a recent development, and replaces the old Wildlife Management Area system which involved only 350 miles of water. Streams on game lands fall under three different sets of fishing regulations: around 741 miles are designated as "General Trout," 201 miles as "Native Trout," and 18 miles as "Trophy Trout."

PHOTO BY TOM ROLLINS

Striped bass reared to fingerling size survive much better than do fry. This rearing, however, requires additional time, effort, and pond space, thus limiting the waters into which fingerlings can be stocked.

The latter two sets of regulations have restrictive creel, bait, and size restrictions; and are aimed at providing quality fishing for wild trout. Annual fish population surveys are conducted on "Native" and "Trophy" waters by division biologists to gather data necessary to properly manage them. In addition, spot creel census information gathered by wildlife protectors during routine patrols is used for the same purpose. Stream improvement devices have been installed in certain streams on the old Wildlife Management areas, and this work will be expanded to other game land waters once surveying and marking of boundary lines is completed and funds become available.

The trout feeding study on Steels and Upper creeks in Burke County has been continued during the biennium. This study was set up to determine the economic and biological feasibility of increasing trout production in a stream by supplementally feeding with pelletized trout food. Automatic feeders originally designed for the project did not work as planned, and feeding has been accomplished by hand. However, suitable automatic feeders now have been obtained, and will be used during the next biennium. Preliminary indications are that the harvest and growth rate of trout in the stream have been increased since feeding began, but conclusions as to the economic feasibility of this type of management must await testing of the automatic feeders.

Striped Bass

Striped bass fry production at Weldon Hatchery was quite low during the 1971 and 1972 spawning seasons. Less than 10 million fry were produced from eggs salvaged from angler-harvested striped bass. These fry were sufficient, however, to supply our needs since stocking policy has changed emphasis from fry stocking to fingerling stocking. Fingerling stocking has proven to be much more successful than fry stocking in producing harvestable stripers. Our current procedure is to rear stripers to fingerling size (about two inches) in hatchery ponds, then stock the young fish in public waters. Much higher survival is obtained by stocking a few hundred fingerlings than from a few million fry.

Lake Norman and Badin Lake are good examples of successful put-grow and take striper management. Fry stockings have failed to produce striped bass fishing in many North Carolina reservoirs. Fingerling stocking, however, in the Catawba and Yadkin river systems has produced harvestable populations in Badin and particularly Lake Norman during the biennium.

It is of particular interest to note that stocking does not automatically insure that catchable fish will follow. The Lake Norman fishery was established by stocking fingerlings in Lake Rhodhiss—three reservoirs upstream. These little fish evidently followed their natural tendency to migrate downstream and most of them successfully passed three dams before they found conditions suitable. Of the thousands of fish passing through Lake Rhodhiss, Hickory and Lookout Shoals, only a few stayed behind to whet the fishing appetite of local anglers.

Chowan River Studies

Pulp Mill Effluent

The study of the effects of stored pulp mill wastes discharges upon Chowan River fishes in North Carolina was completed during the biennium. Salient conclusions reached as a result of the three-year study are as follows: 1) Chowan River contains an excellent game fish population among which no mass migrations appear stimulated by the release of stored pulp mill wastes; 2) Waste releases into Chowan River apparently are not yet of sufficient magnitude to discourage spawning by yellow perch, white perch, herring, or shad; 3) Union Camp Corporation's present release regimen is controlling the nuisance multicellular flocs of *Sphaerotilus,* except during the unstored waste discharges. However, the less ob-

Measuring the flow rate with special equipment at points of waste discharge assists in predicting the effects of such discharge on the fishery involved.

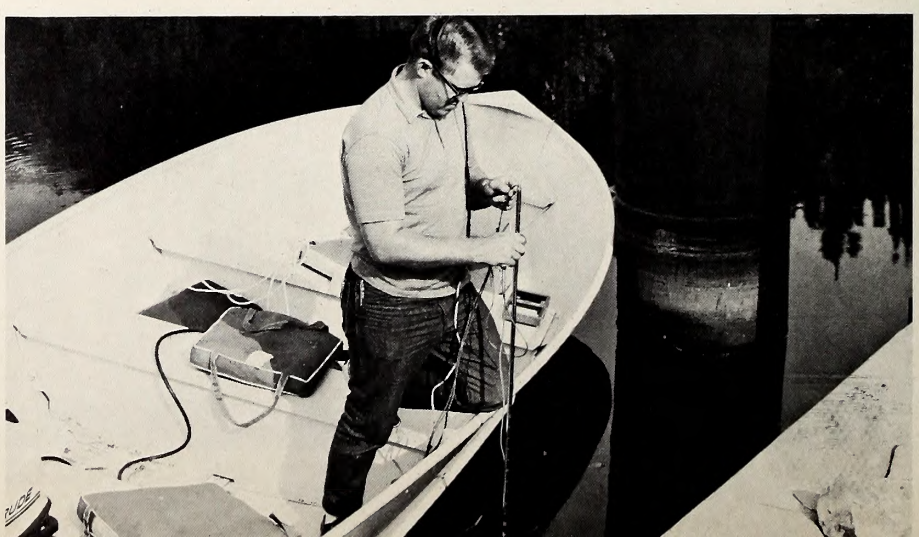


PHOTO BY LARRY BIRCHFIELD

Chemical tests (right), fish population checks (above) and measurement of the abundance of cover in stream, all help determine the quality of redbreast sunfish habitat.

jectionable single cell strain is still present.

Tagging of striped bass was continued in an effort to learn more about the migration habits of this valuable sport and commercial species. Preliminary indications are that the striped bass utilizes Chowan River primarily as a feeding area. Two tags were returned from the Atlantic Ocean indicating that the Albermarle Sound striped bass population does in fact enter the ocean.

Industrial Pumping

As the eastern portion of North Carolina rapidly is changing from an agrarian society to one of urbanization, industries and municipalities alike progressively are becoming more dependent upon surface water supplies to satisfy their ever-increasing demand for process, cooling, and drinking water. Pump intakes, often of gigantic capacity, are seldom screened for more than coarse trash removal. It is assumed that many fish eggs, fry and even fingerlings are sacrificed in pump intakes located on waterways in areas where small fishes are found. A study was designed that will utilize a constant volume pump that can simulate some industrial intake velocities within a range of from 0.5 to 3.0 feet per second. Study efforts are being directed toward herring and shad in the Chowan River while striped bass are of primary concern in the Roanoke River.

Striped Bass In the Tar and Neuse Rivers

Research on the biology of striped bass in streams was concentrated on the declining populations in the Tar and Neuse rivers. Various fish capture methods were tried in the rivers. Drop netting in which gill nets are dropped around a point of land or sand bar from a boat and a noise is produced in the water to drive the fish into the net, was found to be the best method of capture on the Tar River. Eighty striped bass were tagged and released in the Tar. Returns on the tags were 12.5 percent. All striped bass, except one captured in the ocean off of the North Carolina coast, were recaptured by sport and commercial fishermen within five to six miles of the point of release.

Research was shifted to the Neuse River during the last year of the biennium to develop capture techniques and to estimate the spawning striped bass population by a mark-recapture method. The area of the Neuse near New Bern was used as the section to tag and release fish in order that the fish may be recaptured upstream in the Neuse River near Fort Barnwell. The principal capture method was drop netting used downstream and a system of lights and a trap was used upstream. The lights were to act as a barrier and the striped bass, moving upstream during the dark hours, would swim into a dark channel where the trap was located.

The population was not estimated, for very few striped bass were captured in either area. Interviews with commercial fishermen in the New Bern area indicated that the striped bass were scarce during the 1972 spawning run. On the basis that the striped bass population was low, over one million fry were stocked in the Neuse River and 82,000 fingerlings were stocked in the Tar River. The study of the striped bass on the Tar and Neuse rivers will extend through the next biennium.

Redbreast Sunfish

Study continues with this species in the black-water streams of southeastern North Carolina. South River, Big Coharrie Creek, and Six Runs Creek are being subjected to an intensive redbreast sunfish habtiat alteration study. Three test areas within each stream are slated for intense investigation regarding fish population and cover. The sections then will be altered by adding "tire shelters," trees, logs, stumps, etc., and checked again to determine the efforts of the alterations.

Previous studies indicate the redbreast sunfish populations are significantly affected by the amount of stream flow, bottom substrate, available food organisms and the amount of physical obstructions within the streams. These four factors are being carefully measured to find ways of improving redbreast sunfish fishing. Protection of redbreast sunfish habitat against pollution and alteration is essential if we are to maintain our redbreast fishery. A thorough knowledge of the factors influencing the population is essential if we are to improve the fishery. This study should help reach both objectives.

Recent Wildlife Commission activities designed to improve

redbreast fishing include a television program and several magazine articles relating to methods of redbreast sunfish fishing, boats, access, favored streams, tackle and favorite baits. The possibility of a creel full of beautiful redbreast sunfish is mighty tempting to the light-tackle enthusiast.

The Use of Dyes in Pond Vegetation Control

Excessive growths of submersed vegetation have been a continuing problem in Piedmont North Carolina ponds. Mechanical and biological controls have not always been successful. Many herbicides, while successful, have been found to be detrimental to fish, wildlife and/or livestock. Therefore, a study was undertaken to determine the feasibility of screening out sunlight in ponds by the introduction of non-toxic dyes. Since all green plants require sunlight, it was felt that shading with dyes offered a possible method of vegetation control.

Early work centered around determining the depth and light intensities at which most vegetation ceases to grow in Piedmont North Carolina ponds. Then using a black and a blue dye a wide range of dye concentrations was tested to determine which concentrations most effectively reduced light penetration. Recently several ponds, having heavy growth of submersed vegetation, were selected for use in the study. These ponds were dyed with black and blue dyes at various dye concentrations. Currently, tests are being conducted to determine the amount of light screened out by different dye concentrations; the persistence of the dyes in ponds; the effectiveness of different dye concentrations in curtailing vegetation growth and any changes in water chemistry resulting from the dye applications.

Preliminary results indicate that both dyes yield some degree of vegetation control when applied at rates of 10-15 pounds per surface acre. However, persistence within the pond is of a relatively short duration and periodic reapplications of the dyes are necessary.

Testing of Management Procedures

Several fisheries management techniques are being tested to determine their effect on the sport fishery harvest. Largemouth bass, Roanoke bass, and threadfin shad stockings were evaluated using a complete creel census program on Lake Concord, a small Piedmont lake with an established fish population. This impoundment was stocked annually with 200 largemouth fingerlings per acre for three of the four years since 1968, but data did not reveal an overall increase in the bass harvest. The Roanoke bass is a large, rapid growing panfish native to northeastern North Carolina, which has been experimentally relocat-

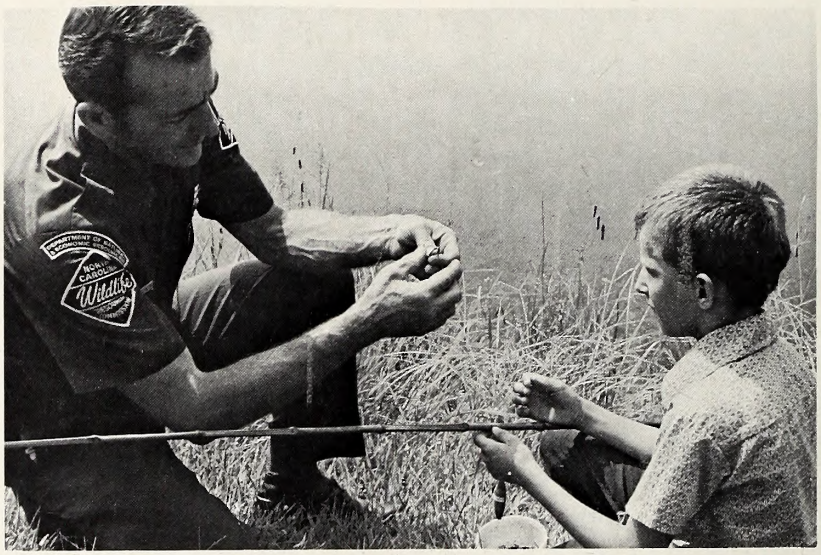


PHOTO BY TOM ROLLINS

Fishing, particularly in Piedmont farm ponds, is often hindered by the excessive growths of submersed vegetation. The use of dyes to control such situations was investigated.

PHOTO BY TOM CROWELL

Old automobile tires, strategically placed in lakes and ponds, provided cover for fish, attachment for fish food organisms, and identifiable "hot spots" which the angler can find. Study of the success of such devices is continuing.

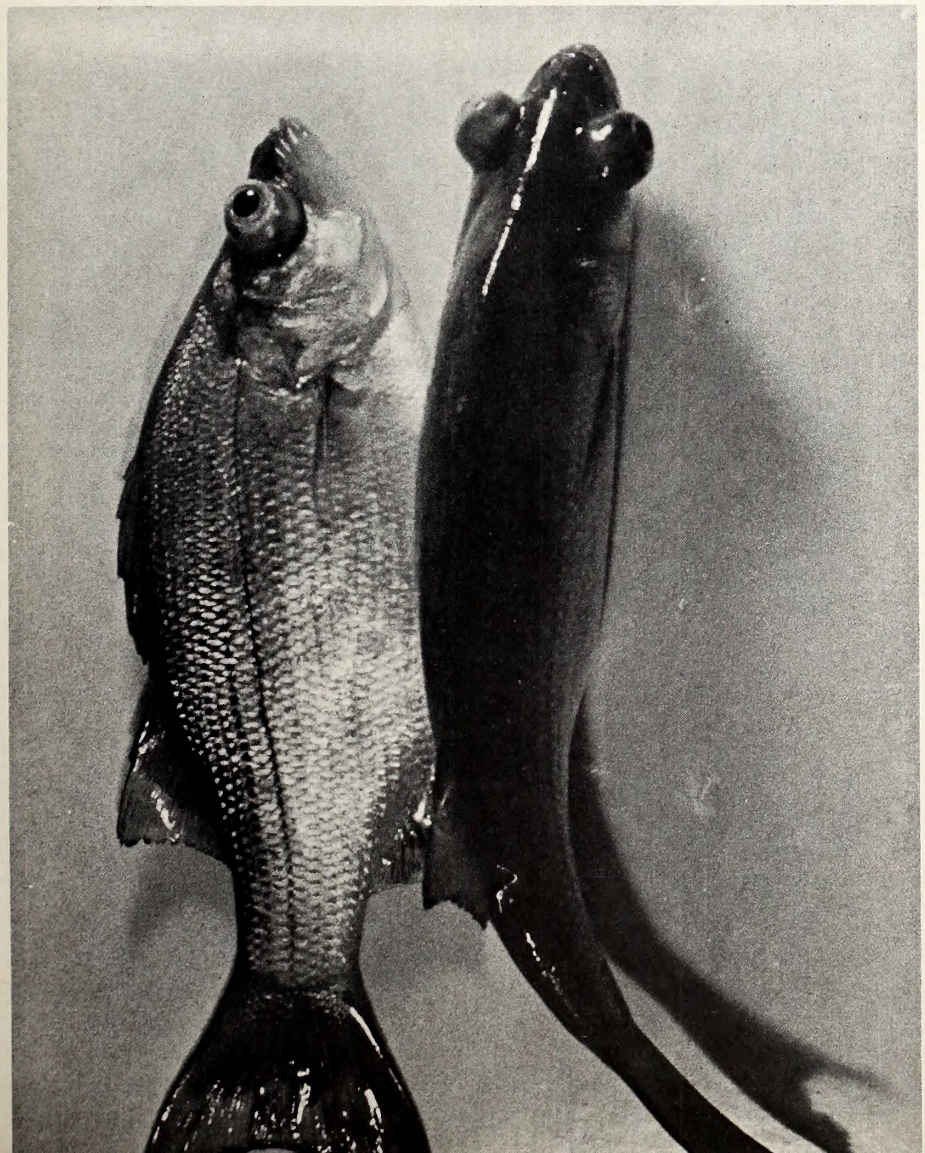
ed to western Piedmont streams and lakes in attempts to expand the range of this desirable game fish. These introductions have yet to be fully evaluated.

Threadfin shad adults have been relocated in Lake Concord every spring since 1968 to increase the lake's food supply by providing a summer supply of young shad before typical winterkill. The introductions attained good to excellent success during three years, and the crappie harvests have consistently increased each year. A total of 39,000 threadfin adults were introduced into 28 bodies of water statewide in 1971, and 71,000 threadfin adults were stocked into 30 waters in 1972. Attempts to reduce an overly abundant, slow-growing crappie population by an angling contest and mid-water trawling, attained only limited success on Lake Thom-A-Lex.

A total of 400 old automobile tires were used to construct fish attractors of several designs and sizes, then weighted with concrete blocks and sunk at three depths in a Piedmont reservoir. Fish sampling procedures will be used to determine the potential of these devices in attracting fish for anglers.

The water level in a sandhills lake was lowered during the winter to provide control of excessive aquatic vegetation. After refilling, a liming, fertilization, and restocking program was initiated in attempts to improve the quality and quantity of the fish population by increasing the primary food supply. The effect of the winter drawdown and fertilization has yet to be fully evaluated in terms of improving the sport fish harvest in an area characterized by low water fertility.

A disease called "popeye" can occur in heated water discharges. Numbers and variety of fish affected and mortality rates involved are questions requiring continued study.



Lake Norman Study

A three-year study of the effects of thermal pollution on the fishes of Lake Norman is now complete. The study was centered in the vicinity of the discharge from Marshall Steam Electric Station on Lake Norman. The power plant utilizes the colder bottom water layer of the lake for cooling purposes.

Because the bottom layer is used, the actual temperature rise after passing through the plant is not excessive for fish. Summertime water temperatures in the discharge area are similar to that of the main lake surface temperatures. However, the studies have shown that this same bottom layer water has very little dissolved oxygen in it both before and after discharges, and that game fishes prefer not to live in the immediate vicinity of the discharge during the summer months. Instead, the discharge is populated by predominately rough fish at this time of year.

During the fall, winter, and spring, the dissolved oxygen levels in the discharge are adequate and several types of forage and game fishes are strongly attracted to the discharge. The presence of the heated water in the winter months allows threadfin shad, a valuable forage species, to overwinter when they might otherwise die-off.

Anglers take advantage of the cold weather concentrations of game fish and the discharge supports an important winter sport fishery, particularly for white bass, striped bass, largemouth bass, and crappie. However, there is danger to fish concentrated in the discharge during the winter and spring from gas-bubble disease. The disease was especially prevalent in the winter of 1970 and is caused by a supersaturation of nitrogen gas in the discharge waters. This supersaturation causes a condition of the "bends" in the fish, most often noticeable as a protruding of the

eyes known as "pop-eye."

How many fish this disease has killed or injured is unknown, but 200 game fish were found dead or dying one day in February of 1970 presumably because of gas-bubble disease.

In summary, there are seasonal effects of the plant discharges of these warm waters on the fishes of Lake Norman in the general vicinity of the discharge canal and cove and both advantages and disadvantages to the fishes of the lake.

Fayetteville Laboratory

Personnel at the Fayetteville laboratory have been involved in collecting macro-invertebrates with the aid of artificial substrate samples developed in an earlier phase of the current biological monitoring study. Four streams, representing various geographic areas of the state, have been selected to test the reliability of biological monitoring as a method to determine the degrees of pollution in specific watersheds. It is evident that certain pollution sensitive organisms such as mayflies, stoneflies and caddis flies are less abundant or absent, immediately downstream from a pollution source, but do exist in increasing numbers upstream from the source.

Data analysis from the four test streams will result in a standardized method whereby long-term degradation of water quality can be detected by simply sampling and analyzing the macro-benthos populations.

Environmental Impact Statements

A more "environmental-conscious" public coupled with more rigidly enforced laws governing situations necessitating preparation of environmental impact statements, has increased the work load approximately sixfold during this biennium.

A total of 466 environmental impact statements were reviewed critically during this biennium as compared to 75 reviews made during 1968-1969. The Corps of Engineers' Section 205 Programs and the Soil Conservation Service's Public Law 566 Projects which prepared the only impact statements reviewed during 1968-1969, were relegated numerically to third and fourth positions during 1970-71. The numbers of impact statements reviewed were as follows: Conservation and Development Permits-221, Highway Projects-123, Corps, of Engineers Programs-55, Soil Conservation Service Projects-44, and all other types-23.

Statewide Creel Census

A statewide creel census was completed during the biennium in a joint effort with the Division of Protection. The census was initiated on a "once-every-eight days" basis April 1, 1970, and terminated March 31, 1971. During that one-year period, wildlife protectors interviewed approximately 40,000 fishermen; usable data were obtained from 39,619 of these anglers. This was the second creel census of fishermen of the inland waters—the first having been conducted in 1964-65.

The objectives of both censuses were to obtain requisite basic management data such as the number of unlicensed fishermen and their share of the harvest, catches in relation to the type of gear in use, catch rates applicable to the individual waters, and the comparative importance of the various game fishes in the total harvest. Objectives of the recently completed census not only included detection of pattern changes during the intervening six years, but—through the application of a more refined statistical approach—to obtain quantitative estimates of total fishing effort and total harvest.

The data obtained during the second statewide creel census have been entered on punch cards, tabulated, and were in various phases of analysis at the close of the biennium.

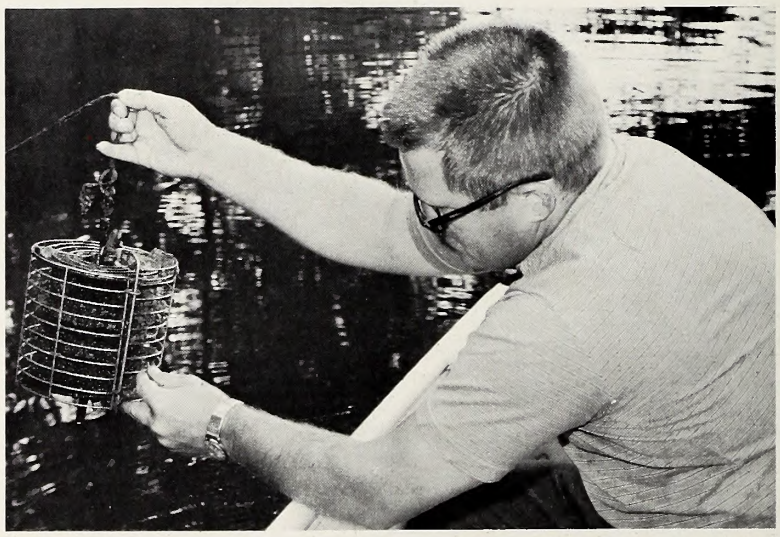


PHOTO BY REX GARY SCHMIDT

Artificial substrate samplers (above) provide a "home" for many aquatic organisms. The kinds and numbers of organisms found in these samples should indicate the quality of the water. The degree to which this is true is being tested. As social pressures increase, efforts to "get back to nature," often result in problems such as this encroachment upon public waters (below).

FISH STOCKING

Biennium, July 1, 1970 to June 30, 1972

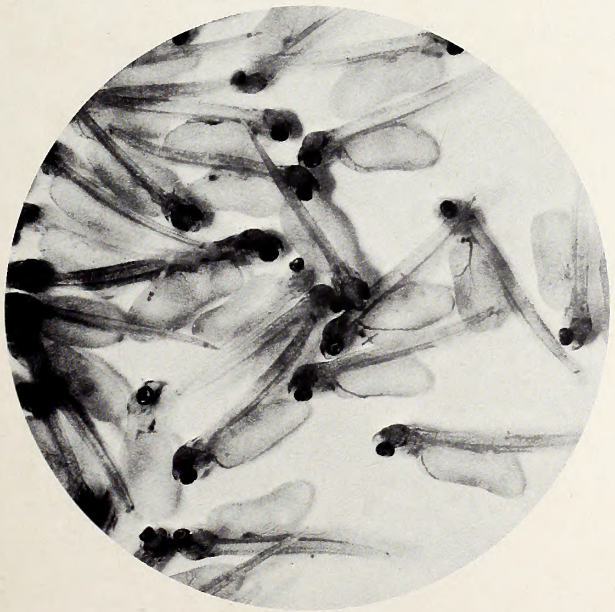
STATE PRODUCTION

Species	Yearlings	Pounds	Fingerlings	Pounds	Yearlings	Pounds	Fingerlings	Pounds
Brook trout	235,510	51,357			143,036	36,309	144,114	1,263
Brown trout	99,270	17,713	500	2	116,690	24,672		
Rainbow trout	204,546	72,308	1,000	29	232,013	71,411	74,481	616
TOTALS	539,326	141,378	1,500	31	491,739	132,392	218,595	1,879

FEDERAL PRODUCTION

Species	Yearlings	Pounds	Fingerlings	Pounds	Yearlings	Pounds	Fingerlings	Pounds
Brook trout	84,600	24,655	126,000	711	79,900	27,557	535,500	3,116
Brown trout	72,650	15,488			79,400	19,105	17,000	448
Rainbow trout	174,550	40,826			174,000	51,925	210,000	991
TOTALS	331,800	80,969	126,000*	711*	333,300	98,587	762,500*	4,555*

* Federal fish stocked by State personnel.



WARM WATER FISHES

Species	1970-71	1971-72
Largemouth bass	234,415	457,949**
Smallmouth bass	52,000	66,500
Bluegill	987,084	698,954
Redbreast sunfish	541,100	312,000
Shellcracker	530,300	631,300
Channel catfish	9,500	60,324*
Roanoke bass	20,293	
Walleye	64,060	
Crappie		3,000
TOTALS	2,438,752	2,230,027

** includes 80,400 Federal fish stocked by State personnel.

RELOCATIONS

Species	1970-71	1971-72
Threadfin shad	25,725	68,945
White bass	152	54
Blueback herring	600	3,475
Opossum shrimp	70,000	
TOTALS	96,477	72,474

STRIPED BASS

	1970-71	1971-72
Fingerlings	209,962	316,418
Fry	3,330,998	6,057,000
TOTAL	3,540,960	6,373,418

DIVISION OF GAME

DURING the biennium ending June 30, 1972, the administrative structure of the Division of Game underwent modification which would provide for improved efficiency of existing programs and personnel. This reorganization created three administrative sections, each of which deals with the three major functions of the division. These sections are Game Lands Management, Wildlife Services and Wildlife Investigations.

Wildlife Services

Throughout its 25-year tenure of responsibility for conservation and wise use of wildlife resources, the Wildlife Resources Commission has recognized the fact that the annual crop of game is largely produced and hunted on privately-owned property. In an effort to assist in producing maximum game populations and providing good hunting, the Commission has had in continuous operation an upland game restoration project which is designed to accomplish these results. Through the Upland Game Restoration program, landowners and sportsmen are provided technical assistance in planning and developing suitable wildlife habitat on farms and other game-producing lands. This approach to more game and better hunting has proved to be the only practical method resulting from many years of trial and error. Techniques used in maintaining suitable wildlife habitat on farms and other land are geared to complement and supplement soil and water conservation efforts, and to blend with the principal production goals of the landowners.

During the 1970-72 biennium, the Services Section of the Commission's Division of Game continued at an accelerated rate its effort to achieve top production and full, but wise, use of the harvestable surplus of game on privately-owned properties. This effort involved response to 1,032 requests from landowners for technical assistance in planning wildlife habitat development programs. These services were provided by a staff of nine district wildlife biologists, operating from headquarters located in each of the nine Commission Districts. Plans developed by the biologists ranged from the preparation of comprehensive, long-range game management programs for large land holdings to advice on manipulation of cropping and other land use practices which would benefit wildlife on the average family-size farm.

In a statewide effort to maintain good wildlife populations, the following amounts of special game food and cover planting materials were distributed free of charge to cooperating landowners and sportsmen: 3,371,000 shrub lespedeza seedlings; 14,843 three-pound planting units of a perennial seed mixture; 54,192 five-pound units of annual seed mixture and 3,509 two-pound units of sericea lespedeza. In addition to these standardized materials, several thousand seed-

PHOTO BY REX GARY SCHMIDT

PHOTO BY TOM ROLLINS

The Commission's plant production nursery (above) on the Sandhills Game Land annually produced enough wildlife habitat improvement planting stock to supply over five thousand landowners in all parts of the state.
Quail, our number-one native game bird, furnished hunting to about 200,000 Tarheel sportsmen who harvested almost two-million bobwhites each year.

lings, of autumn olive, sawtooth oak, French mulberry and other promising wildlife food producers were distributed to interested landowners for further field tests prior to the initiation of volume production in the nursery operation. All planting materials were distributed under the supervision of the district biologists. Wildlife protectors handled the bulk of the delivery of materials to cooperators.

Inspection and evaluation of a randomly selected sample of wildlife plantings established by cooperating landowners are conducted on a semi-annual basis. The survey conducted during the past biennium provided data indicating that more than 80 percent of the materials distributed were planted, and that a comparable percentage of the resulting food and over plantings substantially improved game habitat on the farms where they were established.

The provision of hunting opportunity near urbanized areas for non-landowner hunters was a feature of the Services Section program. Fifteen special dove hunting areas and 15 all-species hunting areas were leased at locations near population centers each year of the biennium. These areas were developed by planting dove attractants on the farms designated for dove hunting only, and by establishing game food and cover plots on the areas where hunting for all species was allowed. Hunting on all of the areas was restricted to Mondays, Wednesdays, Saturdays and national holidays that occurred during the statewide open hunting season.

The biologists in charge of these areas conducted frequent checks to determine levels of hunter use and hunting successes. Their reports indicated heavy hunter use of the dove areas and excellent bags during the early part of the season, with hunter participation diminishing as the season progressed and the birds migrated southward. On the areas where all game species were hunted in season, moderate

PHOTO BY REX GARY SCHMIDT

Dove hunters go to their stands on the Sandhills Game Land. Tarheel sportsmen took from two- to three-million doves each year, with several thousand harvested from this game land.

to heavy hunting pressure and satisfactory harvest throughout the season were reported for most areas. Post season investigations revealed no indication of overharvest of resident game species.

Additional responsibilities of the Services Section included supervision of privately-operated licensed controlled shooting preserves, screening applications for permits to sell pen-raised game birds for food purposes, and supervision of a raccoon transplanting project. The controlled shooting preserve program has expanded from less than a dozen preserves in operation to more

PHOTO BY TOM ROLLINS

The importance of privately-operated licensed controlled shooting preserves increased annually. The supervision of these hunting areas was a responsibility of the Services Section.

Through cooperative programs with power companies, many miles of right-of-way have been established in wildlife food and cover, thereby improving hunting while keeping the right-of-way free of trees that could interfere with the transmission lines.

PHOTO BY REX GARY SCHMIDT

than 40 during the past decade. These commercial enterprises primarily provide recreation for sportsmen whose time for outdoor activities is limited and those who enjoy productive hunting but are unable to participate in rigorous pursuit of wild game.

Administration of the sale of game for food purposes involves exercising maximum precautionary measures to preclude the exploitation of wild native game for commercial purposes. The cooperative raccoon relocation project was conducted under the supervision of a wildlife biologist. During the biennium, 1,356 raccoons were taken from localities in the east where they had increased to farm crop depredation levels and distributed through organized sportsman groups in understocked western counties. Members of participating organizations transported the animals from holding facilities in the east to release sites in western counties. The Commission reimbursed the sportsman groups one-half of the cost of the raccoons.

Game Lands Management

Nearly two million acres of land are open to public hunting under the Wildlife Commission's game lands program. Game lands are located in all sections of the state from the mountains to the coast and provide a cross-section of all types of hunting available in North Carolina. In addition to hunting license requirements, users of the game lands must have a $6.00 game lands use permit which is valid on any game land throughout the entire season. One-half of the revenue from the sale of these permits is paid to the landowners, the other half is used by the Commission for protection and development for improved hunting and fishing. The Commission also posts the boundaries for field identification and prepares maps to aid the hunter in locating the game lands.

The new expanded game lands program was initiated in 1971 and it replaced the old wildlife management area program that was characterized by many different individual hunts, each supported by a special permit and encumbered by check-in and check-out requirements. Under the new program hunters are free to hunt in accordance with locally applicable seasons without having to apply in advance and without having to wait in long lines to check in for hunting or to check out at the end of the day.

Finding the game lands is relatively easy since their locations have been plotted on sections of county highway maps which in turn have been compiled into book form. Books of Game Lands Maps are available free of charge from license dealers or from the Raleigh office of the Commission.

Game lands are classified into three different types, based on species available and hunting time. "Doves only" areas are portions of actively operating farms that are managed for dove hunting and open to hunting three days per week for doves only, during the dove season. These three days are Mondays, Wednesdays and Saturdays. The three-day limitation is required for two reasons: (1) to hold interference with farming operations to a minimum, and (2) to keep from "burning out" the dove fields by overshooting.

"Any game" three day per week areas are also located mostly on actively operating farms but two Commission-owned tracts—Sandhills and Caswell—are also in this group. Several of these areas have been developed for dove hunting and the Sandhills Game Land has annually hosted hundreds of hunters who have taken over 10,000 doves in some years. Since these game

lands are heavily hunted, primarily for doves and quail, and since quality of hunting for these species is better maintained on a staggered day basis, all hunting is held to the three day per week schedule in the interest of regulation simplification.

The remaining game lands, which comprise the bulk of the nearly 2,000,000 acres, are open six days per week. All species of game may be hunted in accordance with statewide regulations, with minor exceptions as stipulated in the annual hunting regulations leaflet.

Over 56,000 hunters bought permits to hunt and fish on game lands during the 1971-72 season. A mail survey of their activities indicated that they expended a total of 305,504 man-days of hunting and bagged a total of 130,642 head of resident small game and 4,488 head of big game. A detailed breakdown of their take is shown in the following table:

AMOUNT OF HUNTING AND GAME HARVEST ON GAME LANDS DURING 1971-72 SEASON

Species	Hunters	Hunter Trips	Number Taken
Deer	35,028	173,953	4,055
Bear	3,593	18,317	213
Boar	2,549	9,203	146
Turkey	370	1,586	74
Squirrel	8,690	44,588	83,179
Quail	2,864	13,852	31,001
Rabbit	2,392	10,403	12,119
Grouse	3,033	12,065	4,343
Dove	4,506	19,308	85,455
Woodcock	144	579	866
Raccoon	2,549	22,432	12,155
Fox	264	933	122
Ducks	1,206	6,080	6,850
Geese	520	1,570	358

*From mail questionnaire survey of hunters.

Game lands personnel include four supervising biologists and twelve three-man development crews. These employees, with the aid of locally employed labor assistants were responsible for the arduous task of locating and posting the boundary lines of the game lands, plus the boundaries of 26 large areas which have been designated by regulation as bear santuaries and which are closed to bear hunting. Other development activities included planting and maintaining deer pastures and other wildlife food-producing acreages; the construction and maintenance of roads and trails for hunter access; controlled burning for game food production and wildfire control; and water level management for habitat improvement for waterfowl.

PHOTO BY TOM ROLLINS

Nearly two million rabbits were harvested annually during the biennium. Together with squirrels and quail, they sustained about 75 percent of the hunting effort in North Carolina.

Restocking of game lands during the biennium was limited primarily to the wild turkey; five areas were stocked with 93 wild-trapped birds.

Financial assistance in the purchase, leasing and development of game lands was received under provisions of the Federal Aid In Wildlife Restoration Act.

Wildlife Investigations

Wildlife investigations in the

Nearly 2,000 cross-roads store proprietors were designated as Wildlife Cooperator Agents, providing hunters with convenient locations for voluntary tagging and reporting of their big game kills. Evaluation of this significant program will continue.

PHOTO BY REX SCHMIDT

PHOTO BY TOM ROLLINS

Many miles of fire lanes (above) were plowed on Commission-owned game lands to contain controlled burning designed to improve wildlife habitat and timber production. Bow hunting (right) for deer increased in popularity and bow hunters became more proficient in bagging their game.

Division of Game are designed to develop and evaluate new management techniques, to determine the game harvest and hunter characteristics, to study the biology of game species for more effective management and regulation, and to evaluate the impact of deleterious land-use practices on the wildlife resource.

The waterfowl segment involves banding waterfowl to gain information on their survival and movements. Personnel banded 5,364 waterfowl during the 1970-71 banding period and 3,788 in 1971-72. Waterfowl aerial surveys were conducted in major North Carolina wintering areas. Noticeable decreases in numbers were noted in Canada geese and substantial increases were noticed in swans, snow geese, American widgeon, and green-winged teal. Harvest information places the wood duck as the number one species, comprising over 15 percent of the waterfowl kill in North Carolina.

American widgeon and mallard were close behind in order of importance to the North Carolina waterfowl hunter. The black duck still holds fourth position in the harvest even though the daily limit has been reduced to one. A new waterfowl management impoundment at Campbell's Creek was completed and added to the areas managed for waterfowl and public hunting in Beaufort, Hyde, Pamlico, and Onslow counties. About 1200 waterfowl hunters annually use these areas and are very successful, averaging about two birds per hunter per trip.

As the public concern and demand for wise resource management and protection against environmental degradation continue to increase, plans for minimizing and mitigating the deleterious effects of many projects on the wildlife resource must be developed. The North Carolina Wildlife Resources Commission has the responsibility of working in behalf of the state's sportsmen to insure adequate attention to protecting and enhancing wildlife values coincident with various development projects. The major areas of concern in the last two years have been:

1. Stream channelization — This is a practice that is totally incompatible with maintaining productive wetlands for wildlife and much attention has been directed at reducing the deleterious impact of such projects.
2. Marsh dredging and filling — All dredge and fill activities in public waters and estuarine areas are subject to review and approval by the Wildlife Resources Commission. Projects are approved only upon effective demonstration that they are not destructive to wetland habitats and the wildlife species associated with these areas.
3. Reservoir construction — In this area of environmental management the Wildlife Resources Commission has continually pointed to the need for a comprehensive and coordinated plan for North Carolina's river systems to insure that a balance be developed between free-flowing rivers and reservoirs. The construction of dam behind dam on every river is a most unwise commitment of North Carolina's natural resources. On individual reservoir projects where considerable acreages of valuable bottomland habitat are inundated, mitigation measures are designed to insure public hunting areas, access, and management for wildlife in the area.
4. All other projects of substantial environmental impact that involve the expenditure of public funds, both federal and state, are reviewed by the Wildlife Resources Commission to insure an adequate consideration of the state's wildlife.

North Carolina's wild turkey restoration efforts are directed at restocking the vast mountain areas with live trapped, wild turkeys. Large releases of these

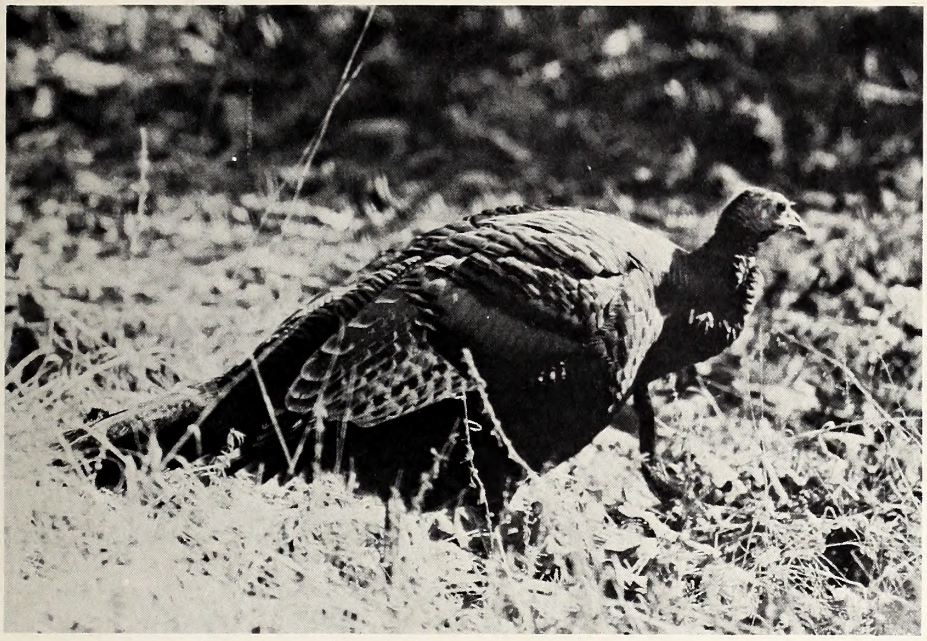


PHOTO BY U. S. MARINE CORPS

Live trapping wild turkeys on areas of relative abundance and release on suitable habitat area resulted in the establishment of successful turkey groups in several locations during the biennium. This prized game bird will continue under investigation.

wild, trapped birds over short time periods in good turkey range have resulted in successful stockings. There is cause for optimism regarding the wild turkey's future in western North Carolina; however, the continued reduction of suitable forest range in the piedmont and coastal plains of the state is cause for concern about the turkey's future in these regions.

The accomplishments of the wild turkey restoration study are summarized in the following table. Efforts to restore this prized game bird to harvestable quantities in the vast, unoccupied mountain ranges of North Carolina are progressing at an encouraging rate.

North Carolina has modified the turkey regulations to feature spring gobbler hunting, which has no effect on turkey numbers, in an effort to protect this superior game species during restoration efforts and in the face of range destruction. Game surveys during the spring gobbler seasons indicated that about 125 gobblers were taken in 1971 and 135 in 1972. Future efforts in wild turkey restoration are expected to be even more fruitful than present results with the commitment of more resources and manpower and with the establishment of new populations from which transplanting stock can be trapped.

Much attention and emphasis is being placed on the black bear in North Carolina. A comprehensive, long-term study on the biology and management of this trophy game species has revealed much insight into the basic requirements of the black bear and the regulations necessary to protect an adequate breeding stock to provide overflow for hunting. Twenty-eight sanctuaries established to protect a breeding nucleus to provide a harvestable overflow are currently being evaluated by a radio-telemetry study of the cruising radius and home range of the black bear.

A mail survey of North Carolina hunters was conducted following the 1970-71 season and the results by Wildlife Commission districts and major game species are given in the table on page 22.

In terms of numbers of hunters, squirrel, rabbit, and deer, respectively, rank as the most important North Carolina game species. The number of deer hunters has grown dramatically since 1964 when there were 125,083 deer hunters. The growth in popularity of deer hunting has continued to increase with the growth of the state's deer population. The number of dove hunters has also continued to increase with the growth of the state's dove population. The number of quail hunters remains about as it was in 1964; however, they have dropped from third to fifth in the rankings due to the increase in deer and dove hunters.

In terms of man-days of recreation the importance ranking is squirrel, rabbit, quail in that order. These three small game species have the longest seasons and afford the greatest opportunity for long term hunting.

An analysis of hunting trips per hunter reveals that squirrel hunters averaged 7.2 days of hunting per season, quail hunters averaged 6.5 days per season, and rabbit hunters 6.2 days per season.

The mourning dove was by far the most abundant species in the North Carolina hunter's bag with an average of 3.7 doves per trip; quail were second with 1.8 quail per trip; and squirrels third with 1.3 per trip.

Careful inspection of the re-

Wild Turkey Restoration — July 1970 - June 1972

Area Stocked	Dates	Males	Females	Total
1. North Mills— Henderson County	Aug. 70 Feb. 71	5	12	17
2. Mt. Mitchell— Yancey County	Feb. 71	6	13	19
3. Harmon Den— Haywood County	Sept. 71	11	16	27
4. Green River— Polk County	Dec. 71 Feb. 72	10	13	23
5. Thurmond Chatham— Wilkes County	Mar. 72	3	4	7
				93

HARVEST BY DISTRICT OF MAJOR GAME SPECIES IN NORTH CAROLINA FROM MAIL SURVEY OF HUNTERS, 1970-71

DISTRICT		DEER	SQUIRREL	RABBIT	QUAIL	DOVE	DUCKS	GEESE
	Hunters	14,521	12,895	9,185	6,762	6,491	7,422	6,096
	Trips	124,340	117,595	60,675	69,480	38,688	50,984	36,307
1	Kill	6,065	163,363	51,647	135,971	114,701	44,381	9,720
	Trip/Hunter	8.6	9.1	6.6	10.3	6.0	6.9	6.0
	Kill/Trip	.05	1.4	.8	2.0	3.0	.9	.3
	Hunters	28,633	38,203	26,341	18,708	26,551	8,449	2,061
	Trips	261,944	368,871	218,405	147,368	162,122	39,247	7,499
2	Kill	9,311	456,788	203,578	238,530	574,937	58,305	898
	Trip/Hunter	9.2	9.7	8.3	7.9	6.1	4.6	3.6
	Kill/Trip	.04	1.2	.9	1.6	3.6	1.5	.1
	Hunters	19,321	41,306	46,258	30,126	26,700	3,301	18
	Trips	136,954	319,505	307,393	182,679	156,284	12,296	54
3	Kill	4,294	316,868	381,256	349,328	670,619	11,360	18
	Trip/Hunter	7.1	7.7	6.6	6.1	5.8	3.7	3.0
	Kill/Trip	.03	1.0	1.2	1.9	4.3	.9	.3
	Hunters	18,267	26,409	24,330	21,437	21,229	8.749	588
	Trips	130,011	227,533	167,076	161,640	126,681	54,337	3,560
4	Kill	5,802	270,538	145,594	329,409	592,026	44,877	279
	Trip/Hunter	7.1	8.6	6.9	7.5	6.0	6.2	6.0
	Kill/Trip	.04	1.2	.9	2.0	4.7	.8	.1
	Hunters	16,863	41,463	40,893	26,701	24,418	1,345	229
	Trips	70,455	268,602	257,601	163,852	109,813	4,630	841
5	Kill	3,477	360,335	255,500	295,411	370,174	4,211	0
	Trip/Hunter	4.2	6.5	6.3	6.1	4.5	3.4	3.7
	Kill/Trip	.05	1.3	1.0	1.8	3.4	.7	0.0
	Hunters	28,793	40,296	39,535	27,813	30,779	4,151	886
	Trips	113,513	220,494	208,650	160,415	119,098	16,635	4,470
6	Kill	3,184	298,115	193,715	323,384	497,391	14,401	294
	Trip/Hunter	3.9	5.5	5.3	5.8	3.9	4.0	5.0
	Kill/Trip	.03	1.4	.9	2.0	4.2	.9	.1
	Hunters	16,689	19,232	33,950	18,314	14,054	1,504	37
	Trips	39,487	194,905	184,450	111,144	57,858	4,047	55
7	Kill	905	246,171	164,710	123,061	208,634	2,205	0
	Trip/Hunter	2.5	10.1	5.4	6.1	4.1	2.7	1.5
	Kill/Trip	.02	1.3	.9	1.1	3.6	.5	0.0
	Hunters	28,164	40,258	32,931	15,273	19,664	1,746	203
	Trips	86,614	270,661	174,677	90,467	99,319	4,837	718
8	Kill	2,062	387,295	201,366	146,697	342,575	4,714	0
	Trip/Hunter	3.1	6.7	5.3	5.9	5.0	2.8	3.5
	Kill/Trip	.02	1.4	1.2	1.6	3.4	1.0	0.0
	Hunters	20,209	26,716	20,435	8,595	5,520	1,482	0
	Trips	64,419	218,301	101,700	40,667	14,581	2,613	0
9	Kill	3,245	274,740	111,590	47,753	49,486	999	0
	Trip/Hunter	3.2	8.2	5.0	4.7	2.6	1.8	0.0
	Kill/Trip	.05	1.3	1.1	1.2	3.4	.4	0.0
	Hunters	190,731	302,202	271,728	174,425	179,207	38,203	10,130
	Trips	986,960	2,170,012	1,683,068	1,129,604	904,936	193,505	53,582
Statewide	Kill	38,405	2,760,804	1,707,030	1,992,616	3,333,807	185,821	11,271
	Trip/Hunter	5.1	7.2	6.2	6.5	5.0	5.1	5.3
	Kill/Trip	.04	1.3	1.0	1.8	3.7	.9	.2

gions of North Carolina reveals that squirrel hunting is popular across the state in general, as is deer hunting. Dove hunting is concentrated in the eastern and piedmont areas where this quarry is typically abundant. Rabbit and quail hunters are predominantly located in the piedmont section of the state where small game is abundant and the hunting opportunity near population centers is primarily for small game such as quail and rabbits. Waterfowl hunting is quite naturally more concentrated in the east where the overwintering ducks and geese are most abundant.

Another mail survey was conducted following the 1971-72 hunting season; this survey was designed to evaluate the Game Lands concept of furnishing public hunting opportunity. Several interesting and informative facts were revealed by the response of game lands hunters who were sampled regarding their hunting effort and kill. The tabular results of this mail survey by game species are given in the Game Lands Management Section. Following is a listing of the most pertinent findings of this survey.

1. Of the 52,353 Game Lands Use Permits reported through February, 1972, 44.5 percent were purchased for both hunting and fishing, 54.8 percent were purchased for hunting only, and 6.7 percent were for fishing only.
2. A total of 41,515 hunters or 79.3 percent used their permits on game lands in 1971-72. The other 20.7 percent did not hunt on game lands for one reason or another.
3. There were 6,824 archery hunters using game lands during the 1971-72 season; this represents 13.0 percent of the game lands hunters.
4. A total of 21,845 or 41.7 percent of game lands hunters did all of their hunting on game lands and 30,296 or 57.9 percent did some portion of their hunting here.
5. The 41,515 game lands hunters spent a total of 305,504 days hunting 14 game species. This represents an average of 7.4 days of hunting for each permit user. The four National Forest Game Lands led in man-days of hunting with a total of 194,680 or 63.4 percent of the hunting effort on game Lands. Pisgah Forest provided 93,011 hunter-days; Nantahala Forest 44,280 hunter-days; Croatan Forest 34,632 hunter days; and Uwharrie Forest 22,757 hunter-days.
6. The state and industrial lands managed as game lands supported a total of 103,738 hunter-days of recreation.
7. The major game species hunted on Game Lands during the 1971-72 season was deer. A total of 35,028 deer hunters spent 173,953 days hunting deer and harvested 4,055 deer on Game Lands. These 35,000 deer hunters represent about 20 percent of the total number of deer hunters in North Carolina; therefore about one out of every five deer hunters in North Carolina does some portion of his deer hunting on game lands. On the average, the game lands deer hunter went deer hunting four times and harvested one deer per 42.9 deer hunter-days. One game lands deer hunter out of every 10.7 was successful in bagging his deer during the season. The following table summarizes the deer kill and hunter success for the major deer hunting game lands:
8. Squirrel hunters were the second most common among game lands hunters. Some 8,690 squirrel hunters spent 44,588 days in harvesting 83,179 squirrels from game lands—an average of 9.6 squirrels per hunter and 1.9 squirrels per trip. The average squirrel hunter spent 5.1 days hunting on game lands.
9. Dove hunters were third on the list of game lands hunters numbering 4,506. The dove-only game lands provided 7,086 hunter-days of dove shooting and the harvest was reported at 31,036 doves or 4.4 per hunter per trip. This average daily harvest rate is far above that for the state in general and the special development plantings to attract doves are believed to account for this hunter success on game lands.
10. Following in order by number of hunters are the species ranking below deer, squirrel, and dove: bear (3,593 hunters), grouse (3,033), quail (2,864), boar (2,549), raccoon (2,549), rabbit (2,392), ducks (1,206), geese (520), turkey (370), fox (264), and woodchuck (144).
11. The ranking by species in order of the number of hunter-days spent on Game Lands is: deer (173,953 hunter-days), squirrel (44,588), raccoon (22,432), dove (19,308), bear (18,317), quail (13,852), grouse (12,065), rabbit (10,403), boar (9,203), ducks (6,080), turkey (1,586), geese (1,570), fox (933), and wood cock (579).

Deer Harvest and Hunter Success on Selected Game Lands, 1971-72

Game Land	Hunters	Trips	Harvest	Trips/ Hunter	Hunters/ Kill	Trips/ Kill
1. Nantahala	4656	18,303	717	3.9	6.5	25.6
2. Pisgah	14190	50,656	947	3.6	15.0	53.5
3. Uwharrie	5350	18,640	331	3.5	16.3	56.3
4. Croatan	2436	22,558	309	9.3	7.9	73.0
5. Sandhills	2912	10,173	175	3.5	16.6	58.1
6. South Mountains	2053	6,014	124	2.9	16.6	48.5
7. Butner*	4048	18,429	560	4.6	7.2	32.9
8. Holly Shelter	1253	3,542	183	2.8	6.8	19.4
9. Hoffmann Forest	859	3,807	140	4.4	6.1	27.2
TOTAL FOR ALL GAME LANDS	43274	173,953	4055	4.0	10.7	42.9

*Includes one day of hunters' choice harvest.

DIVISION OF EDUCATION

A prime function of the Division of Education is to inform the people of North Carolina of the need for using the wildlife resources of our state wisely, and to obtain active public support and cooperation in the improvement and perpetuation of hunting and fishing.

Following is a report of the activities carried on toward accomplishing these objectives.

Publications

The printed word is still considered the most effective means of reaching masses of people. Although printed material is given close competition by radio, television, and motion pictures, it is the permanence of published information that gives it an advantage.

The major publication of the Commission is the monthly magazine, WILDLIFE IN NORTH CAROLINA. During the two years of the biennium, monthly circulation averaged well over 100,000 with an estimated readership of 500,000 people per month.

Complimentary copies are sent to all school libraries and all public libraries in the state, plus all physicians, dentists and barber shops. This has resulted in an increased subscription sales to people who can scan through the magazine and use the subscription form provided in each issue.

Other publications distributed include:

Birds

Bird Furniture
Bluebird Special
List of Native Plants and Shrubs that can be Planted for Bird Food
Summer Birds in Your Backyard
Winter Bird Feeders
Winter Birds in Your Backyard

Fish

Carp in North Carolina
Cricket Culture
Fish Facts
Fishing North Carolina Waters
How to Raise Fishing Worms for Bait
Largemouth Bass in North Carolina
Rainbow Trout in North Carolina
The Bluegill in North Carolina
The Catfishes
The Crappie in North Carolina

Game Birds and Animals

All About Wildlife
Build a Wood Duck House
Life History and Management of the Beaver in North Carolina
Management of the Bobwhite Quail in North Carolina
Management of the Eastern Cottontail Rabbit in North Carolina
Management of the Muskrat in North Carolina
Management of the Ruffed Grouse in North Carolina
Management of the White-tailed Deer in North Carolina
Management of the Wild Turkey in North Carolina
Our Wildlife Neighbors
Squirrel Box Plan
The European Wild Boar in North Carolina
The Squirrel (Fox and Gray)

Miscellaneous

Boating North Carolina Waters
Don't Eat the Daisies
Ecology Reprints
Safety for the Hunter
So You Want to Pick Flowers!

Regulations

Designated Public Mountain Trout Waters
Motorboat Regulations
North Carolina Fishing Rules
North Carolina Game Lands
North Carolina Hunting and Trapping Regulations
North Carolina Motorboat Owner's Guide
North Carolina's Boating and Water Safety Law
North Carolina Statutes on Game, Fish, and Boat Laws
Regulation Standards for Facilities Used in Holding Legally Acquired Wildlife in Captivity

Production of the Wildlife Commission's monthly magazine "Wildlife in North Carolina" was one of the accomplishments of the Division of Education during the biennium.

PHOTOS BY REX SCHMIDT

The magazine received the Governor's Award in Conservation Education for year 1971. This was presented by the North Carolina Wildlife Federation.

One of the most popular of the above was "Our Wildlife Neighbors," which was reprinted in the summer of 1972.

Audio-Visual Aids

Although such media as radio, television and motion pictures reach vast audiences, it is impossible to measure the impact of these with any degree of accuracy. The over-all effect, however, is extremely significant.

During the biennium a series of 13-week, one-half hour color television programs had been produced. It was found, however, that the cost-ratio of these left much to be desired. The programs were not generally given prime air time, and were not reaching large viewing audiences. These programs were discontinued, and in their place production of a series of short public-service spot announcements was begun. These were given prime viewing time, often during newcasts, and are considered to be much more effective.

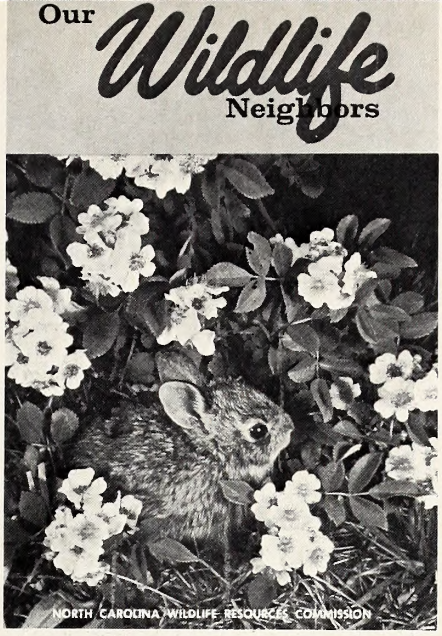
A weekly seven-minute radio program was transcribed throughout the biennium and sent to radio stations distributed widely across the state. These were inexpensive to produce, and had an immeasurable impact on the listening public. It is estimated that air time granted free by cooperating stations amounted to well over $125,000 per year.

The motion picture film library was in continuous demand by schools, civic clubs and other organizations. During the school year average film distribution was about 145 prints per month.

Films Available:

Birds
Birds of Prey
Know Your Ducks
The Bald Eagle
The Story of the Mourning Dove
The Whooping Crane
The Wild Turkey
Wildfowl in Slow Motion
Wood Duck Ways
Bobwhite Through the Year

Conservation
Clean Waters
Waters of Coweeta
We Share This Land



An updating and reprinting of the popular "Wildlife Neighbors" booklet provided an important informational distribution piece of literature.

Ecology
A Way of Life
Conservation and Balance in Nature
Estuarine Heritage
Green City

Fish
Life in a Trout Stream
The Sunfish
Saltwater Rodeo
Way of a Trout

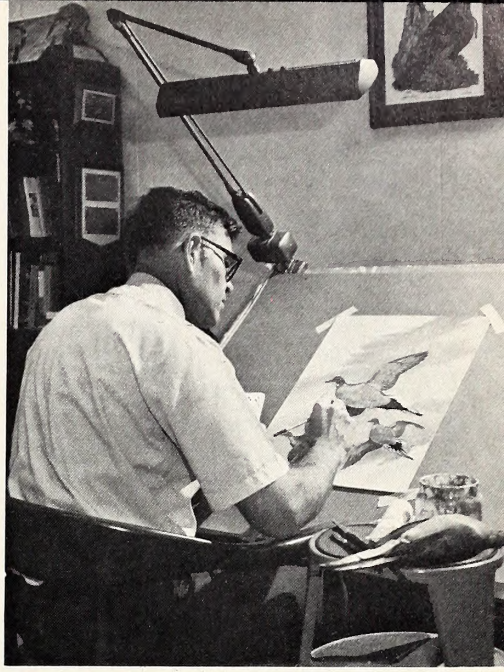
Hunting
Archery in North Carolina
Bay at the Moon
Gunning the Flyways
Quail Hunt
The Whitetail Buck
Unusual Hunting in North Carolina

Hunter Safety
Lost Hunter
Shooting Safety
Sure as Shooting
Trigger Happy Harry

Mammals
Mammals of the Countryside
Wildlife Babies

Nature Study
Exporing the Farmland
Field Trip to a Fish Hatchery
Islands of Green
The Window

Pollution and Habitat Destruction
A Place to Live
Cry of the Marsh
George Washington's River
Land of the Prairie Ducks
Marshland is not Wasteland
Population and Pollution
So Little Time
Soliloquy of a River
The Gifts
The Persistent Seed



PHOTOS BY REX SCHMIDT

Many pieces of artwork, including cover layouts for Wildlife magazine and other publications were staff-produced during the biennium.

Water Safety
Boats, Motors, and People
Capsizing and Sinking, Fall Overboard
Find a Float
Lifesaving Device, Suddenly & Without Warning
Outboard Outings
Suddenly Upon the Waters
Survival for Sportsmen
Water Wisdom

A series of color transparency slides was produced for use by Commission field personnel in giving illustrated lectures to various civic and school groups.

The Press

Newspapers throughout the state gave excellent cooperation

Over a hundred news releases went out to all news outlets in the state. One of the top stories concerned the new, expanded game lands program.

in using news releases on the subjects of wildlife management, hunter safety and motorboats and water safety. Many newspapers used periodical outdoor news features. A number of major daily papers devoted a full page each Sunday on hunting, fishing, wildlife conservation, and boating. Wildlife is the only natural resource in the state to receive this kind of news coverage. A newly inaugurated feature "Wildlife Afield" received immediate success.

Photography

Several thousands of feet of motion picture film were exposed for television use and for future motion picture film production. Both black and white and color still photographs were produced for illustrating various departmental publications and news features. Cataloged files contain about 25,000 negatives and prints.

Education-Extension

Limited personnel made it impossible for the Division of Education to meet all requests for personal appearances at schools, civic clubs, wildlife clubs, and other organizations. The demand was supplemented by qualified personnel of other divisions.

Division personnel worked closely in liaison with the planning levels of public schools, Future Farmers of America, and 4-H groups in establishing wildlife conservation programs and projects.

As a part of extension work many educational exhibits were provided at fairs, outdoor sport shows, and a number of schools. Two major exhibits involved the North Carolina State Fair at Raleigh and the Dixie Classic Fair at Winston-Salem.

Television "spots," of 30- to 60-seconds replaced the half-hour weekly program previously produced. Filming continued on subjects such as water safety, fishing, and wildlife management for future use.

PHOTOS BY REX SCHMIDT

The Commission's State Fair exhibit was further expanded and included native game animals and fish, thus acquainting visitors with our wildlife resources.

DIVISION OF MOTORBOATS & WATER SAFETY

DURING this biennium, the Division of Motorboats and Water Safety continued to expand in providing services to the boating public. The continued growth in the popularity of boating and the number of boaters have resulted in an increased demand for new boating access areas, more waterway markers, more miles of stream clearance, and an increased emphasis in the boating safety program.

Boating Access Area Program

Among the many services that this division provides, the boating access area program is perhaps the most popular with the public. During this biennium, eight new boating access areas were developed and opened to the public resulting in a total of 107 access areas operated by this division. Plans have been made to complete an additional four access areas by the end of the calendar year 1972.

This program is a dynamic one as the existing areas are constantly being evaluated. High use areas are improved and low use areas are sometimes discontinued to release funds for use in the development of new areas. Division personnel are constantly making site investigations for new access areas. If the investigation is favorable, public need is high and the cost of the land is within available funds, the division recommends to the Commisson that the site be acquired. If the Commission approves the acquisition of the proposed site, the Department of Administration is requested to acquire the site. Upon notification that the State has acquired title to the proposed site, plans are then made for the development of the site. During this biennium, the following new access areas were developed:

Sawpit Landing — Northeast Cape Fear River — Pender County

Swansboro — Intracoastal Waterway — Carteret County

Bogue Sound — Morehead City — Carteret County

Avey Creek — Santeetlah Lake — Graham County

High Rock—Tuckertown Reservoir — Davidson County

Rockingham — Pee Dee River — Richmond County

Smith's Creek—Pamlico River — Beaufort County

Cox's Ferry — Neuse River — Wayne County

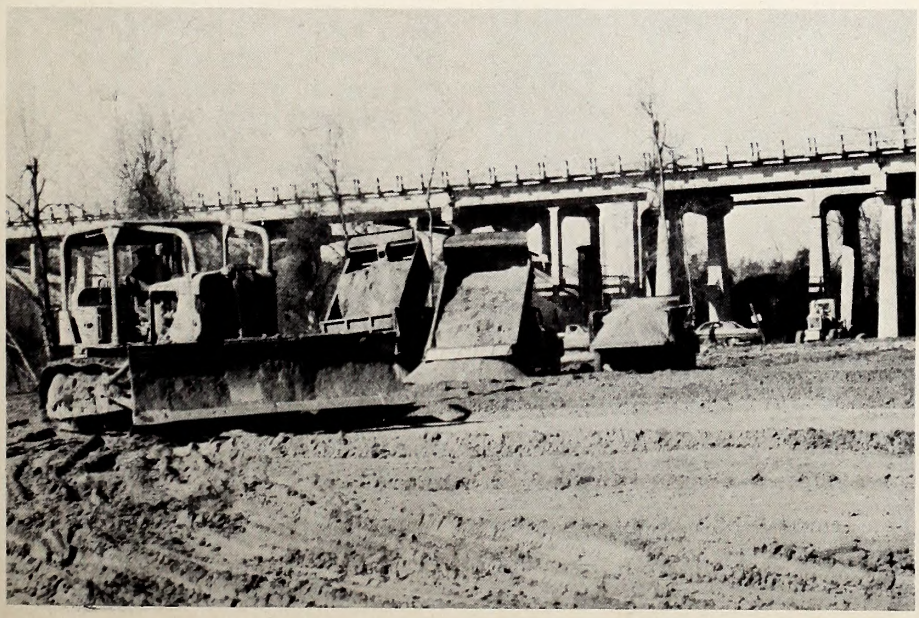
At the end of the biennium, twelve sites are pending development. It might be well to mention at this point that funds for the access area program come from the motorboat registration fee and from the small portion of the state tax on gasoline which was allocated to the Wildlife Resources Commission by the 1969 General Assembly.

A majority of the new access areas are being developed by the division's engineering personnel. The use of division owned equipment by our engineering force has proven to be an economical and highly satisfactory means of access area development. In addition to site construction, our engineering personnel are responsible for area maintenance and improvement. Additional ramps, boarding docks and night lights have been added to a large number of the areas in response to the public demand.

Waterway Improvement

The waterway improvement program is an increasingly popular one as requests for stream clearance operations continue to exceed our capacity. The Commission, recognizing this problem, has authorized the establishment of two additional waterway improvement teams. With the establishment of these new teams, we will have three, two

PHOTO BY BILL JANSEN



Development of boating access areas continued to be an important function of the Division during the biennium, with eight new areas completed and opened to the public. Inspection and acquisition of others also received careful consideration.

PHOTO BY TED DOSSETT

Information type buoys were placed in many waterway situations by Division personnel. Here, a water fowl resting area is marked with permanently anchored buoys (below). The waterway improvement program, designed to open up potential fishing streams to the public with a minimum of fish shelter removal, cleared many miles of small streams (above).

PHOTO BY BILL JANSEN

man teams for the stream clearance program. Plans are to have these additional teams established, trained, and equipped by Spring 1973.

This past biennium has been a busy one for our waterway improvement team and many miles of inland fishing waters were opened to navigation. This team is trained to remove only those obstructions necessary to allow stream navigation. These clearance operations are performed using only light equipment such as chain saws, small winches, hand tools and small boats.

Waterway Marking

The waterway marking program continued to develop during the biennium. "No-wake" buoys have been installed at a number of the access areas. The division has installed some "Danger" buoys on a limited basis to mark boating hazards. A new program was started to mark the Waterfowl Rest Areas in Currituck Sound during the waterfowl hunting season. The marking of these areas proved very satisfactory to the hunter, fishermen, and Protection Division personnel. It is planned that this program will be an annual one.

Plans are made to continue to expand the waterway marking program during the next biennium. Additional "no-wake" and "danger" buoys will be purchased during Fall, 1972 and these buoys will be installed in time for the 1973 boating season. Additional buoys will be purchased as funds permit.

Boating Safety

The boating safety education program has grown during this biennium with the addition of a boating safety coordinator to the staff. He is presently developing a boating safety course to be offered for use within our public schools and is preparing magazine articles and news releases to pass on information to our boatmen.

This biennium has also seen a marked increase in audio-visual aids and booklets being used to

help inform the boating public. A boating safety film library has been established recently, and this along with television and radio spots being aired throughout the state, plus boating safety demonstrations by Protection Division personnel, and the availability of good boating safety booklets is credited with reaching more Tarheel boatmen than ever before.

In addition to the above mentioned programs, cooperative efforts in the field of boating safety with other organizations such as the United States Coast Guard and United States Coast Guard Auxiliary, United States Power Squadrons, Red Cross, United States Corps of Engineers, and local water safety organizations have been very successful in reaching the boating public. This division is also working with other states in the field of boating safety.

Boating Accident Reports

This division receives and analyzes reports of boating accidents which must be submitted by individuals when one of the following things results from a boating accident: death of an individual involved, incapacitation of an individual for a period of seventy-two hours or more, or one hundred dollars or more in property damage. By studying these accident reports, we are able to identify situations which are likely to cause accidents, and identify certain bodies of water which have high accident rates. With this information we can then see what type of action is required to help eliminate these accidents, which may include requesting the legislature to enact boating safety laws designed to reduce the number of deaths, injuries, or the amount of damages.

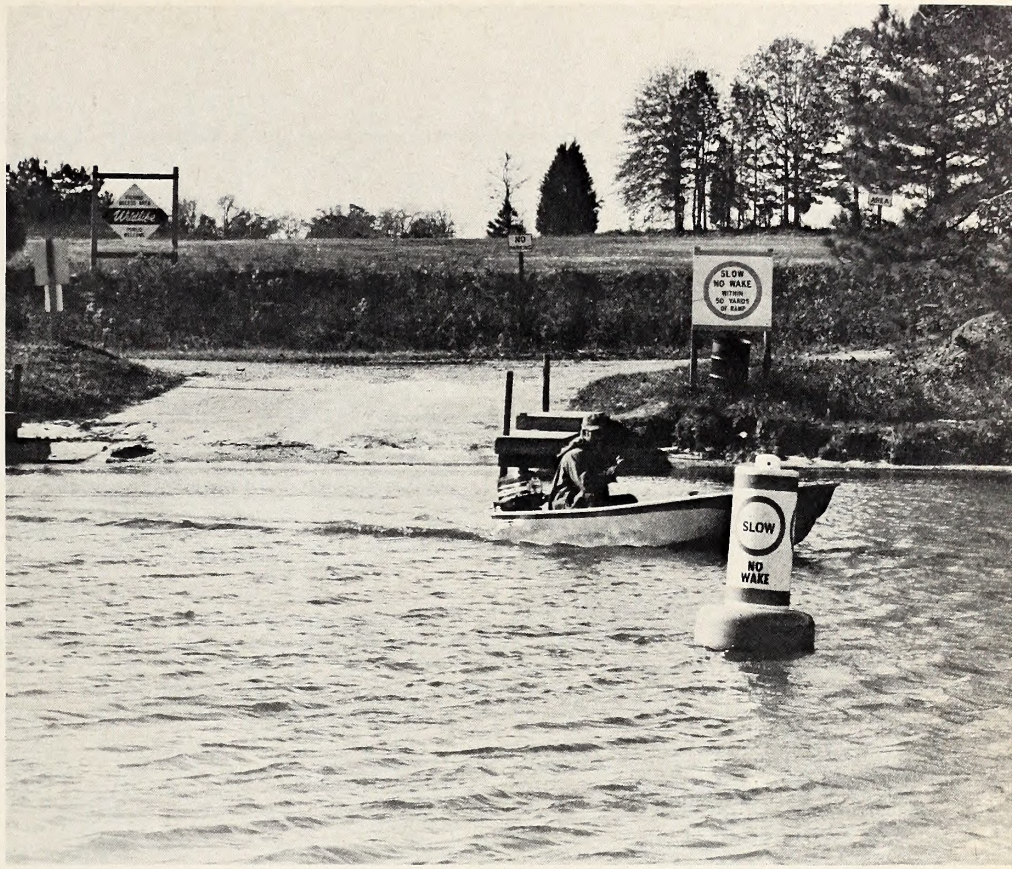


PHOTO BY REX SCHMIDT

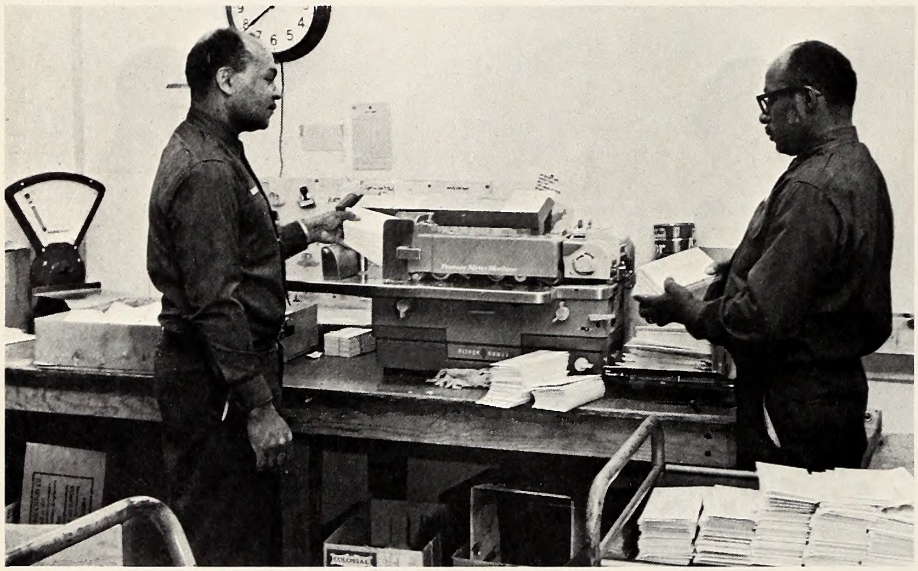
Waterway markers of various kinds were placed at many potentially dangerous spots on public waters, as part of the continued service to Tarheel boaters.

PHOTO BY TIM REID

Boating accident reports were collected and studied to determine steps needed to prevent boating mishaps. The failure to use personal floation devices contributed to several tragedies.

PHOTOS BY REX SCHMIDT

Data processing, using modern electronic equipment and trained personnel, aided many functions of the Commission during the biennium (above). Handling of incoming and outgoing mail reached an all-time high volume during the biennium, with thousands of individual pieces of mail handled each week.



• **ADMINISTRATIVE SERVICES continued from page 30**

automatic and merit increments, transfers, separations; and employee benefits.

The average number of permanent positions in the Commission during the biennium was 344. Of these there were 171 enforcement officers, 36 game land technicians, 30 biologists, seven education specialists, four engineering technicians, 20 fish hatchery employees, three foresters, eight administrative personnel, 45 clerical employees, and 20 nonprofessional workers.

Data Processing

During the biennium, modern electronic data processing and data processing personnel made valuable contributions to the programs of the Commission. License agent accounts were kept current and available for immediate retrieval of information when needed. As the volume of applications for certificates of boat number increased, data processing shortened the time required to issue certificates. WILDLIFE IN NORTH CAROLINA subscription lists were kept up-to-date, a factor in maintaining good public relations. Finally, surveys and investigations were assisted in the compiling of data needed for administrative planning and management. As the biennium ended, studies were completed for the conversion of budgetary accounting to data processing in the next biennium.

Warehousing

A warehouse near the Raleigh headquarteres of the Commission was operated during the biennium. The facility was used to store and distribute uniforms, automotive and boating supplies, and new and used motor vehicles and motorboats.

For control purposes, a perpetual inventory system was in operation. An actual count of the inventory on hand each month was reconciled with perpetual inventory controls kept at the Raleigh headquarters.

WILDLIFE BUDGET — CODE 26741 — JULY 1, 1970 - JUNE 30, 1972

I. ADMINISTRATION	1970-71	1971-72
Salary—Director	$ 21,362.04	$ 21,682.50
Salaries and Wages—Staff	78,187.17	86,311.44
Postage, Tel., Teleg., & Express	3,035.35	2,999.58
Travel Expense	2,893.84	3,301.03
Printing and Binding	975.14	2,563.09
General Expense	9,091.47	12,591.68
Equipment	1,656.28	402.69
Commission Expense	5,734.67	4,575.34
TOTAL	$ 122,935.96	$ 134,427.35

II. FINANCE AND PERSONNEL	1970-71	1971-72
Salaries and Wages—Permanent	$ 92,645.63	$ 94,319.80
Salaries and Wages—Temporary	9,561.36	16,406.49
Supplies and Materials	6,863.69	4,840.92
Postage, Tel., Teleg., & Express	28,949.00	30,831.45
Travel Expense	183.65	561.20
Printing and Binding	51,310.18	54,181.73
Operation of Equipment	1,478.42	699.21
Public Utilities	1,193.52	1,307.95
Repairs and Alterations	802.81	1,825.20

FINANCE-PERSONNEL Continued

	1970-71	1971-72
General Expense	13,687.48	10,048.60
Equipment	40,739.55	7,532.29
Warehouse Stock Inventory	2,888.62	533.07
TOTAL	$ 250,303.91	$ 223,087.91

III. WILDLIFE PROTECTION

Salaries and Wages—Permanent	$1,405,386.40	$1,604,115.05
Salaries and Wages—Temporary	7,726.13	9,995.16
Supplies and Materials	4,701.17	7,796.97
Postage, Tel., Teleg., & Express	11,926.51	18,764.05
Travel Expense	86,635.54	105,093.41
Printing and Binding	5,878.55	2,874.59
Operation of Equipment	177,178.92	224,632.88
Repairs and Alterations	265.01	517.57
General Expense	43,743.61	49,846.09
Motor Vehicle Exchange	197,891.58	157,197.87
Equipment	64,057.20	90,629.84
Uniforms	41,805.05	47,083.72
TOTAL	$2,047,195.67	$2,318,547.20

IV. EDUCATION

Salaries and Wages—Permanent	$ 84,761.00	$ 88,525.00
Salaries and Wages—Temporary	969.60	1,345.00
Supplies and Materials	7,393.72	6,677.47
Postage, Tel., Teleg., & Express	11,264.55	9,843.33
Travel Expense	3,440.58	3,673.99
Printing and Binding	61,270.25	69,378.71
Operation of Equipment	425.69	443.21
Repairs and Alterations	222.01	413.02
General Expense	8,342.62	14,921.40
Equipment	1,868.45	3,487.44
Motion Pictures	107.23	126.99
Television Productions	3,036.54	2,068.11
TOTAL	$ 183,102.24	$ 200,903.67

V. FISH MANAGEMENT ADMINISTRATION

Salaries and Wages—Permanent	$ 35,717.53	$ 38,453.25
Salaries and Wages—Temporary	212.50	1,306.00
Supplies and Materials	2,789.26	(4,796.78)
Postage, Tel., Teleg., & Express	1,083.18	1,149.21
Travel Expense	1,960.63	2,787.51
Printing and Binding	796.26	904.32
Operation of Equipment	1,542.61	879.88
Repairs and Alterations	115.80	4.50
General Expense	186.70	5.31
Equipment	317.95	1,348.73
TOTAL	$ 44,722.42	$ 42,041.93

VI. WAYNESVILLE HATCHERY

Salaries and Wages—Permanent	$ 19,456.00	$ 21,228.09
Salaries and Wages—Temporary	742.40	142.50
Supplies and Materials	8,370.92	6,656.26
Postage, Tel., Teleg., & Express	237.88	266.66
Travel Expense	660.82	464.81
Operation of Equipment	1,282.11	946.07
Power and Lights	100.73	138.56
Repairs and Alterations	4,106.97	2,478.40
General Expense	—0—	30.00
Motor Vehicle Exchange	1,121.89	—0—
Equipment	299.47	—0—
TOTAL	$ 36,379.19	$ 32,351.35

VII. MARION HATCHERY

Salaries and Wages—Permanent	$ 25,900.84	$ 28,491.45
Salaries and Wages—Temporary	460.80	—0—
Supplies and Materials	9,958.01	12,456.05
Postage, Tel., Teleg., & Express	425.69	449.65
Travel Expense	1,053.41	903.56
Operation of Equipment	1,754.78	1,507.12
Power and Lights	411.79	325.32
Repairs and Alterations	870.93	2,407.12
Motor Vehicle Exchange	(1,280.22)	—0—
Equipment	337.82	63.91
TOTAL	$ 39,893.85	$ 46,604.18

VIII. FAYETTEVILLE HATCHERY

	1970-71	1971-72
Salaries and Wages—Permanent	$ 19,815.10	$ 20,144.06
Salaries and Wages—Temporary	779.20	243.20
Supplies and Materials	9,758.98	6,548.12
Postage, Tel., Teleg., & Express	390.03	537.37
Travel Expense	893.78	478.03
Operation of Equipment	1,314.45	1,480.06
Power and Lights	573.88	717.01
Repairs and Alterations	570.95	1,748.73
Motor Vehicle Exchange	3,133.00	—0—
Equipment	380.20	306.99
TOTAL	$ 37,609.57	$ 32,203.57

IX. ROARING GAP HATCHERY

Salaries and Wages—Permanent	$ 25,157.19	$ 20,518.87
Salaries and Wages—Temporary	140.80	—0—
Supplies and Materials	5,981.84	5,683.37
Postage, Tel., Teleg., & Express	185.62	249.29
Travel Expense	839.89	694.09
Operation of Equipment	627.63	1,327.09
Power and Lights	404.77	419.55
Repairs and Alterations	460.97	357.53
Equipment	344.49	114.54
TOTAL	$ 34,143.20	$ 29,364.33

X. ARMSTRONG HATCHERY

Salaries and Wages—Permanent	$ 35,944.16	$ 40,772.39
Salaries and Wages—Temporary	752.00	—0—
Supplies and Materials	7,390.30	5,785.49
Postage, Tel., Teleg., & Express	1,058.37	845.22
Travel Expense	1,671.67	2,106.93
Operation of Equipment	4,166.63	4,868.10
Power and Lights	563.75	676.45
Repairs and Alterations	1,092.75	2,301.50
Motor Vehicle Exchange	7,444.34	1,246.77
Equipment	638.88	375.67
TOTAL	$ 60,722.85	$ 58,978.52

XI. TABLE ROCK HATCHERY

Salaries and Wages—Permanent	$ 13,657.48	$ 15,040.21
Salaries and Wages—Temporary	1,164.80	1,453.98
Supplies and Materials	767.19	1,348.70
Postage, Tel., Teleg., & Express	226.53	349.70
Travel Expense	749.59	672.03
Operation of Equipment	829.34	1,086.85
Power and Lights	112.65	124.41
Repairs and Alterations	1,665.55	2,036.68
Motor Vehicle Exchange	4,750.00	—0—
Equipment	388.47	315.23
TOTAL	$ 24,311.60	$ 22,427.79

XII. GAME MANAGEMENT SUPERVISION

Salaries and Wages—Permanent	$ 22,194.00	$ 23,749.37
Salaries and Wages—Temporary	—0—	216.00
Supplies and Materials	56.22	77.75
Postage, Tel., Teleg., & Express	415.57	381.49
Travel Expense	1,566.55	1,817.96
Equipment	—0—	550.37
TOTAL	$ 24,232.34	$ 26,792.94

XIV. LAKE MATTAMUSKEET

Salaries and Wages—Permanent	$ 8,517.12	$ 3,787.40
Salaries and Wages—Temporary	2,497.60	5,391.60
Supplies and Materials	181.58	174.39
Postage, Tel., Teleg., & Express	532.09	156.79
Travel Expense	189.52	74.01
Operation of Equipment	831.02	1,488.23
Power and Lights	82.25	46.30
Repairs and Alterations	184.54	—0—
Motor Vehicle Exchange	—0—	3,386.54
Equipment	.59	—0—
TOTAL	$ 13,016.31	$ 14,505.26

XV. STATEWIDE HUNT MANAGEMENT

Salaries and Wages—Temporary	$ 607.10	$ 1,586.50
Supplies and Materials	2,113.07	2,037.32

STATEWIDE HUNT MANAGEMENT Continued

	1970-71	1971-72
Postage, Tel., Teleg., & Express	50.00	—0—
Printing and Binding	203.45	4,778.74
General Expense	908.76	—0—
TOTAL	$ 3,882.38	$ 8,402.56

XVI. SANDHILLS, UWHARRIE, CASWELL AND COWAN'S FORD MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 55,994.63	$ 53,650.63
Salaries and Wages—Temporary	17,958.80	17,708.76
Supplies and Materials	8,549.61	15,518.48
Postage, Tel., Teleg., & Express	1,224.15	2,199.87
Travel Expense	2,812.96	1,549.29
Operation of Equipment	10,722.32	12,619.51
Power and Lights	508.87	492.39
Repairs and Alterations	2,868.59	9,788.53
General Expense	460.00	1,434.50
Motor Vehicle Exchange	886.31	14,543.44
Equipment	12,789.06	6,680.31
TOTAL	$ 114,775.30	$ 136,185.71

XVIII. STATEWIDE FOREST MANAGEMENT

Salaries and Wages—Permanent	$ 50,345.00	$ 55,013.00
Salaries and Wages—Temporary	6,774.00	8,459.62
Supplies and Materials	1,085.86	1,420.82
Postage, Tel., Teleg., & Express	305.77	399.29
Travel Expense	1,978.64	2,019.12
Operation of Equipment	3,680.84	3,650.05
General Expense	164.00	457.81
Motor Vehicle Exchange	6,447.44	5,869.22
Equipment	1,041.39	63.73
TOTAL	$ 71,822.94	$ 77,352.66

XIX. WILD TURKEY RESTORATION

Salaries and Wages—Permanent	$ 12,266.90	$ 13,092.00
Salaries and Wages—Temporary	2,663.90	3,977.40
Supplies and Materials	682.74	191.23
Postage, Tel., Teleg., & Express	135.26	199.24
Travel Expense	855.05	1,333.04
Operation of Equipment	1,160.93	1,855.79
General Expense	—0—	788.51
Motor Vehicle Exchange	3,277.42	—0—
TOTAL	$ 21,042.20	$ 21,437.21

XX. GAME SURVEYS AND INVESTIGATIONS

Salaries and Wages—Permanent	$ 9,517.80	$ 10,373.00
Salaries and Wages—Temporary	2,314.25	4,354.25
Supplies and Materials	390.92	180.81
Postage, Tel., Teleg., & Express	2,951.62	2,299.93
Travel Expense	247.25	993.41
Operation of Equipment	284.34	270.19
General Expense	2,344.54	930.12
TOTAL	$ 18,050.72	$ 19,401.71

XXI. GAME MANAGEMENT COORDINATION

Salaries and Wages—Permanent	$ 25,950.00	$ 26,743.55
Salaries and Wages—Temporary	556.62	649.56
Supplies and Materials	361.36	272.10
Postage, Tel., Teleg., & Express	233.09	299.64
Travel Expense	1,089.96	735.81
Printing and Binding	685.39	1,359.65
Repairs and Alterations	15.10	—0—
Equipment	—0—	121.16
TOTAL	$ 28,891.52	$ 30,181.47

XXII. WESTERN WILDLIFE MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 109,204.07	$ 90,102.10
Salaries and Wages—Temporary	10,836.80	8,757.20
Supplies and Materials	5,596.94	11,394.22
Postage, Tel., Teleg., & Express	2,610.12	2,999.33
Travel Expense	4,178.72	3,458.67
Operation of Equipment	13,656.43	11,789.60
Power and Lights	214.50	54.22
Repairs and Alterations	1,632.01	139.52
General Expense	1,190.00	2,780.37
Motor Vehicle Exchange	(143.28)	25,728.39
Equipment	135.35	316.58
TOTAL	$ 149,111.66	$ 157,520.20

XXIII. NORTHERN WILDLIFE MANAGEMENT AREAS

	1970-71	1971-72
Salaries and Wages—Permanent	$ 102,138.22	$ 84,122.24
Salaries and Wages—Temporary	21,994.20	8,717.57
Supplies and Materials	9,160.36	8,628.03
Postage, Tel., Teleg., & Express	2,170.67	2,679.73
Travel Expense	3,698.49	2,680.56
Operation of Equipment	19,176.13	14,302.27
Power and Lights	523.70	111.82
Repairs and Alterations	684.99	439.49
General Expense	1,335.14	3,006.75
Motor Vehicle Exchange	3,803.30	36,162.81
Equipment	10,641.90	4,770.68
TOTAL	$ 175,327.10	$ 165,621.95

XXIV. EASTERN WILDLIFE MANAGEMENT AREAS

Salaries and Wages—Permanent	$ 51,490.61	$ 68,288.68
Salaries and Wages—Temporary	18,914.60	30,039.54
Supplies and Materials	5,802.60	10,028.65
Postage, Tel., Teleg., & Express	1,115.76	1,649.22
Travel Expense	3,212.45	5,673.06
Operation of Equipment	16,646.62	13,198.76
Power and Lights	82.37	175.24
Repairs and Alterations	713.75	1,232.76
General Expense	2,907.14	1,923.99
Motor Vehicle Exchange	5,995.18	13,690.22
Equipment	5,757.24	37,779.82
TOTAL	$ 112,638.32	$ 183,679.94

XXV. UPLAND GAME RESTORATION

Salaries and Wages—Permanent	$ 122,349.45	$ 150,887.39
Salaries and Wages—Temporary	31,121.72	18,167.82
Supplies and Materials	24,910.93	24,142.63
Postage, Tel., Teleg., & Express	2,916.82	3,399.08
Travel Expense	8,461.37	8,904.86
Printing and Binding	1,004.28	374.29
Operation of Equipment	12,723.79	13,420.28
Power and Lights	214.75	264.42
Repairs and Alterations	118.55	74.09
General Expense	22,645.10	21,253.67
Motor Vehicle Exchange	16,439.04	5,705.85
Equipment	1,829.70	4,271.74
Purchase of Raccoons	3,101.00	1,820.00
TOTAL	$ 247,836.50	$ 252,686.12

XXVI. COOPERATIVE RESEARCH

General Expense	$ 18,240.00	$ 21,028.00

XXVII. STATEWIDE WATERFOWL MANAGEMENT

Salaries and Wages—Permanent	$ 11,304.00	$ 20,009.28
Salaries and Wages—Temporary	5,265.20	4,774.94
Supplies and Materials	2,248.47	1,277.37
Postage, Tel., Teleg., & Express	325.35	349.59
Travel Expense	603.44	954.09
Operation of Equipment	1,479.76	2,340.24
Repairs and Alterations	425.16	466.89
General Expense	372.00	680.55
Motor Vehicle Exchange	3,277.42	—0—
Equipment	1,870.74	2,633.66
TOTAL	$ 27,171.54	$ 33,486.61

XXVIII. DATA PROCESSING UNIT

Salaries and Wages—Permanent	$ 46,828.00	$ 55,018.50
Salaries and Wages—Temporary	3,303.76	2,507.15
Supplies and Materials	5,856.21	4,659.68
General Expense	30,232.87	26,645.02
Equipment	780.83	237.35
Salaries and Wages—Temporary—Employee on Loan	123.28	104.71
Travel Expense	—0—	71.40
TOTAL	$ 87,124.95	$ 89,243.81

XXX. FISHERIES MANAGEMENT COORDINATION

Salaries and Wages—Permanent	$ 19,474.13	$ 19,065.67
Supplies and Materials	37.96	84.85
Postage, Tel., Teleg., & Express	315.65	166.70
Travel Expense	101.60	311.48
General Expense	250.00	—0—
Equipment	299.82	—0—
TOTAL	$ 20,479.16	$ 19,628.70

XXXI. FISHERIES SURVEY AND MANAGEMENT

	1970-71	1971-72
Salaries and Wages—Permanent	$ 119,664.30	$ 139,824.50
Salaries and Wages—Temporary	26,843.73	36,796.13
Supplies and Materials	5,610.81	8,684.37
Postage, Tel., Teleg., & Express	3,888.66	3,959.56
Travel Expense	9,192.45	10,904.12
Printing and Binding	506.35	1,410.65
Operation of Equipment	10,408.80	11,370.68
Power and Lights	94.05	199.71
Repairs and Alterations	520.22	167.23
General Expense	10,391.90	5,653.28
Motor Vehicle Exchange	11,836.52	6.23
Equipment	16,231.49	12,354.82
TOTAL	$ 215,189.28	$ 231,331.28

XXXII. LAKE MANAGEMENT STUDY

Power and Lights	$ 9.11	$ —0—

XXXIII. POWER RESERVOIR MANAGEMENT

Salaries and Wages—Permanent	$ 9,260.68	$ 13,305.72
Salaries and Wages—Temporary	8,660.80	1,741.60
Supplies and Materials	274.43	309.76
Postage, Tel., Teleg., & Express	47.94	199.51
Travel Expense	405.42	532.92
Operation of Equipment	1,506.32	1,294.85
Equipment	728.54	—0—
TOTAL	$ 20,884.13	$ 17,384.36

XXXIV. RIVERS AND STREAMS PROJECT

Salaries and Wages—Permanent	$ 17,442.00	$ 17,394.05
Salaries and Wages—Temporary	2,758.40	682.40
Supplies and Materials	1,242.39	1,677.14
Postage, Tel., Teleg., & Express	134.89	249.36
Travel Expense	855.10	685.68
Operation of Equipment	2,166.97	1,539.78
Repairs and Alterations	23.75	—0—
Motor Vehicle Exchange	—0—	(1,151.51)
Equipment	325.93	99.80
TOTAL	$ 24,949.43	$ 21,176.70

XXXVII. MISCELLANEOUS REQUIREMENTS

Workmen's Compensation	$ 8,617.41	$ 23,855.50
State Retirement	205,334.93	222,367.87
Insurance and Bonding	19,846.79	21,506.43
Counties Share of Timber Receipts	17,255.84	51,620.20
General Expense	6,726.58	—0—
Bus Transportation	480.08	—0—
Social Security	127,110.36	140,074.53
Radio Communications	6,008.95	13,691.81
Transfer to Dept. of Natural & Economic Resources	—0—	15,382.82
TOTAL	$ 391,380.94	$ 488,499.16

XL. U.S. FOREST SERVICE

Payment of U. S. Forest Service Part of Receipts	$ 75,000.00	$ 75,000.00

XLII. WELDON HATCHERY

Salaries and Wages—Temporary	$ 51.20	$ 402.79
Supplies and Materials	342.63	—0—
Postage, Tel., Teleg., & Express	70.82	61.97
Power and Lights	63.56	90.18
Repairs and Alterations	90.89	195.18
TOTAL	$ 619.10	$ 750.12

XLIII. CAPITAL IMPROVEMENT FUND

Transfer to Capital Improvement Fund	$ 435,246.89	$ 562,500.00

XLIV. TRANSFER TO MOTORBOAT FUND

Reverted from Capital Improvement Fund	$ 27,643.66	$ —0—

LXX. SPECIAL FUND

	1970-71	1971-72
Acquisition, Development & Management of Lands & Waters	$ 81,743.00	$ 81,743.00
Enlarging, Expanding Activities of the Protection Division	40,871.00	40,871.00
Enlarging, Expanding Activities of the Education Division	40,871.00	40,871.00
TOTAL	$ 163,485.00	$ 163,485.00

LXXXV. ENGINEERING

Salaries and Wages—Permanent	$ 41,926.13	$ 57,868.00
Salaries and Wages—Temporary	24,830.40	16,363.31
Supplies and Materials	1,306.65	2,778.67
Postage, Tel., Teleg., & Express	786.99	880.81
Travel Expense	9,592.29	10,803.10
Operation of Equipment	13,305.88	8,507.84
Power and Lights	151.80	250.22
Repairs and Alterations	54,033.95	44,973.92
General Expense	772.34	272.50
Motor Vehicle Exchange	6,028.77	11,369.70
Equipment	7,509.64	10,462.47
TOTAL	$ 160,244.84	$ 164,530.54
REFUND OF RECEIPTS AND EXPENSES	1,079.33	23,505.80
TOTAL EXPENDITURES	$ 466,751.43	$ 573,482.46

MOTOBOAT BUDGET — CODE 26743
JULY 1, 1970 - JUNE 30, 1972

LXXX. ADMINISTRATION

Salaries and Wages—Permanent	$ 18,677.00	$ 22,067.00
Salaries and Wages—Temporary	—0—	338.40
Supplies and Materials	4.89	633.94
Postage, Tel., Teleg., & Express	338.78	660.87
Travel Expense	694.73	1,356.27
Printing and Binding	10,366.35	11,156.28
Operation of Equipment	—0—	8.47
General Expense	351.59	242.00
Motor Vehicle Exchange	—0—	2,993.94
Equipment	—0—	538.59
Transfer to Code 26741	17,009.00	3,570.00
Transfer to Dept. of Natural and Economic Resources	—0—	1,641.38
TOTAL	$ 47,442.34	$ 45,207.14

LXXXI. FINANCE AND PERSONNEL

	1970-71	1971-72
Salaries and Wages—Permanent	$ 18,364.68	$ 32,196.00
Salaries and Wages—Temporary	10,043.00	9,458.63
Supplies and Materials	1,274.24	1,241.90
Postage, Tel., Teleg., & Express	9,906.23	11,962.00
Printing and Binding	1,291.39	5,296.40
Repairs and Alterations	67.55	69.81
General Expense	3,657.89	21,881.97
Equipment	5,219.98	976.83
Retirement	7,807.06	10,076.36
Social Security	4,913.90	6,592.08
TOTAL	$ 62,545.92	$ 99,751.98

LXXXII. WILDLIFE PROTECTION MOTORBOAT ENFORCEMENT

Transfer to Code 26741	$ 195,439.00	$ 110,487.00

LXXXIV. CAPITAL IMPROVEMENT FUND

Transfer to Capital Improvement Fund	$ —0—	$ 130,000.00

RECEIPTS

Registrations—Boat	$ 249,873.00	$ 280,468.81
Gasoline Tax Refund Allocation	234,706.47	246,314.72
Funds Reverting from Capital Improvement Fund	27,643.66	—0—
Refund of Receipts and Expenses	1,079.33	23,505.80
Miscellaneous Receipts	4,132.27	59.00
Federal Aid—Boating Safety	—0—	52,141.19
TOTAL RECEIPTS	$ 517,434.73	$ 602,489.52

MOTORBOAT BUDGET — CODE 26743
SUMMARY OF OPERATIONS

	1970-71	1971-72
Transferred from preceding year	$ 183,861.66	$ 234,544.96
Gross Receipts for year	517,434.73	602,489.52
Total Available Funds	$ 701,296.39	$ 837,034.48
Less Expenditures	466,751.43	573,482.46
*Operating Reserve—June 30, 1971	$ 234,544.96	
*Operating Reserve—June 30, 1972		$ 263,552.02

*This operating reserve is required for meeting payrolls and other obligations during the months of July, August, and September each year when revenue from motorboat registrations is very low.

REFUND OF RECEIPTS AND EXPENSES	$ 129,946.89	$ 146,816.63
TOTAL EXPENDITURES	$5,499,317.83	$6,030,035.90

RECEIPTS

Hunting and Fishing Licenses	$3,954,180.11	$4,065,698.91
Management Area Receipts	216,861.73	191,804.51
Federal Cooperation	707,485.74	1,231,158.27
Miscellaneous Receipts	34,355.21	31,527.74
Sale of Surplus Property	50,848.71	45,869.79
Sale of Publications	91,617.58	80,674.94
Rent of State Property	11,360.94	8,138.60
Reimbursement from Motorboat Fund	212,448.00	114,057.00
Payments for Employee on Loan	123.28	104.71
Donations	20.00	32.00
Refunds of Receipts and Expenses	129,946.89	146,816.63
TOTAL	$5,409,248.19	$5,915,883.10

SUMMARY OF OPERATIONS

	1970-71	1971-72
Funds transferred from preceding year	$1,399,296.89	$1,309,227.25
Gross Receipts for year	5,409,248.19	5,915,883.10
Total Available Funds	$6,808,545.08	$7,225,110.35
Less Expenditures	$5,499,317.83	$6,030,035.90
*Operating Reserve—June 30, 1971	$1,309,227.25	
*Operating Reserve—June 30, 1972		$1,195,074.45

*This operating reserve is required for meeting payrolls and other obligations during the months of July, August, and September each year when revenue from hunting and fishing license receipts is very low.

SUMMARY OF COMMISSION RECEIPTS FOR TEN YEAR PERIOD 1962-63 - 1971-72

The following table gives a picture of the growth in Wildlife Revenue during the past ten years.

Fiscal Year	Receipts
1962-63	$3,145,216.21
1963-64	3,213,184.84
1964-65	3,446,620.80
1965-66	3,823,857.59
1966-67	4,039,229.00
1967-68	4,325,366.00
1968-69	4,522,591.23
1969-70	5,778,336.50
1970-71	5,409,248.19
1971-72	5,915,883.10

HUNTING LICENSES AND PERMITS

	1970-71		1971-72	
	Number	Amount	Number	Amount
Resident Combination Hunting and Fishing Licenses	179,563	$1,256,941.00	184,515	$1,291,605.00
Resident County Licenses	94,077	211,673.25	82,610	185,872.50
Resident State Licenses	124,307	621,535.00	118,047	590,235.00
Nonresident Licenses	5,762	123,883.00	5,816	125,044.00
Nonresident 6-Day Licenses	2,440	42,090.00	2,436	42,021.00
Resident State Trapping Licenses	948	3,792.00	936	3,744.00
Hunting Guides' Licenses	209	992.75	199	945.25
Resident County Trapping Licenses	875	2,625.00	842	2,526.00
Controlled Shooting Preserve Licenses	205	1,230.00	280	1,680.00
Game Lands Daily Big Game Permits	39,576	158,304.00	--	--
Raccoon and Opossum Permits	704	3,520.00	--	--
Resident Add-On Party Member Permits	305	762.50	--	--
Nonresident Add-On Party Member Permits	12	60.00	--	--
Wilderness Permits	424	5,088.00	--	--
Resident Party Leader Permits	52	3,900.00	--	--
Lake Mattamuskeet Waterfowl Permits	1,898	3,796.00	--	--
Bush Blind Licenses—Dare County	393	491.25	391	488.75
Waterfowl Blind Licenses—Currituck County	466	466.00	462	462.00
Shooting Point Licenses—Currituck County	265	2,385.00	273	2,457.00
Season Game Lands Permits	8,025	40,125.00	--	--
Game Lands Use Permits	--	--	56,402	310,211.00
Special Big Game Hunting Licenses	139,679	209,518.50	140,244	210,366.00
Nonresident Trapping Licenses	2	50.00	2	50.00
Nonresident Landowners Licenses	41	205.00	52	260.00
County Resident Fur Dealers Licenses	21	105.00	18	90.00
State Resident Fur Dealers Licenses	29	725.00	33	825.00
Resident County Fur Dealers Licenses	11	110.00	12	120.00
Nonresident Fur Dealers Permits	2	2.00	2	2.00
Nonresident Fur Dealers Licenses	--	--	--	--
TOTALS	600,291	$2,694,375.25	593,572	$2,769,004.50

Hunting Licenses are sold for the fiscal year, and fishing licenses are sold for the calendar year. Since combination hunting and fishing licenses are on a fiscal year basis, the total income derived is included therefrom in the hunting license table.

The comparative figures shown above are for the license years and cannotbe added together to obtain a total revenue figure for any fiscal year. The correct revenue figures for the fiscal years 1970-71 and 1971-72 are shown in the budget.

FISHING LICENSES AND PERMITS

	1970		1971	
	Number	Amount	Number	Amount
Resident State Daily Licenses	84,494	$ 84,494.00	73,172	$ 73,172.00
Resident County Licenses	28,290	63,652.50	24,265	54,596.25
Resident State Licenses	143,070	715,350.00	143,072	715,360.00
Nonresident State Daily Licenses	24,708	49,416.00	22,850	45,700.00
Nonresident State 5-Day Licenses	12,905	51,620.00	13,891	55,564.00
Nonresident State Licenses	8,059	72,531.00	9,319	83,871.00
Resident Special Trout Licenses	57,387	114,774.00	58,105	116,210.00
Nonresident Special Trout Licenses	3,104	12,416.00	3,156	12,624.00
Resident Special Rough Fish Licenses	5,410	8,115.00	4,840	7,260.00
Resident Shad-Herring-Mullet Special Licenses	9,969	14,953.50	9,363	14,044.50
Management Area Special Daily Permit	12,445	18,667.50	12,117	18,175.50
Nonresident Special Rough Fish Licenses	33	99.00	15	45.00
Nonresident Special Shad-Herring-Mullet Licenses	76	228.00	74	222.00
Resident State Bow and Arrow Licenses	973	1,459.50	988	1,482.00
Nonresident Bow and Arrow Licenses	--	--	2	6.00
Management Area Season Fishing Permit	1,273	19,095.00	1,334	20,010.00
Eastern and Central Game Lands Permit	945	2,835.00	1,041	3,123.00
TOTALS	393,141	$1,229,706.00	377,604	$1,221,465.25

PERMANENT HUNTING AND FISHING LICENSES

	1970		1971	
	Number	Amount	Number	Amount
Residents—65 years old and over	4,922	$ 49,220.00	4,308	$ 43,080.00
Residents—70 years old and over	8,022	free	5,389	free
100% Disabled War Veterans	441	3,307.50	425	3,187.50
TOTALS	13,385	$ 52,527.50	10,122	$ 46,267.50

SPECIAL LICENSES

	1970		1971	
	Number	Amount	Number	Amount
Game Bird Propagation Licenses	926	$ 1,852.00	963	$ 1,926.00
Game Fish Propagation Licenses	24	120.00	32	160.00
Non-Game Fish Propagation Licenses	11	5.50	14	7.00
TOTALS	961	$ 1,977.50	1,009	$ 2,093.00

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PHOTO BY F. S. BARKALOW, JR.

NOW WHAT? *"Something good's inside," says Bugger, a young gray squirrel, but how to get at it seems to be a problem. For a story on nest boxes for Bugger and his friends,* *see page 20.*

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WILDLIFE N NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 101,722

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 2 FEBRUARY, 1973

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An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

Just a few more days to pursue the cottontail; the season closes February 10. Although the cottontail rabbit responds to management practices such as the planting of various food and cover plants, populations often vary from year to year for obscure reasons. Most hunting seasons have been good, however. More on artist R. J. McDonald is found on page 27.

Prairie Duck Problems

by Dr. Keith W. Harmon

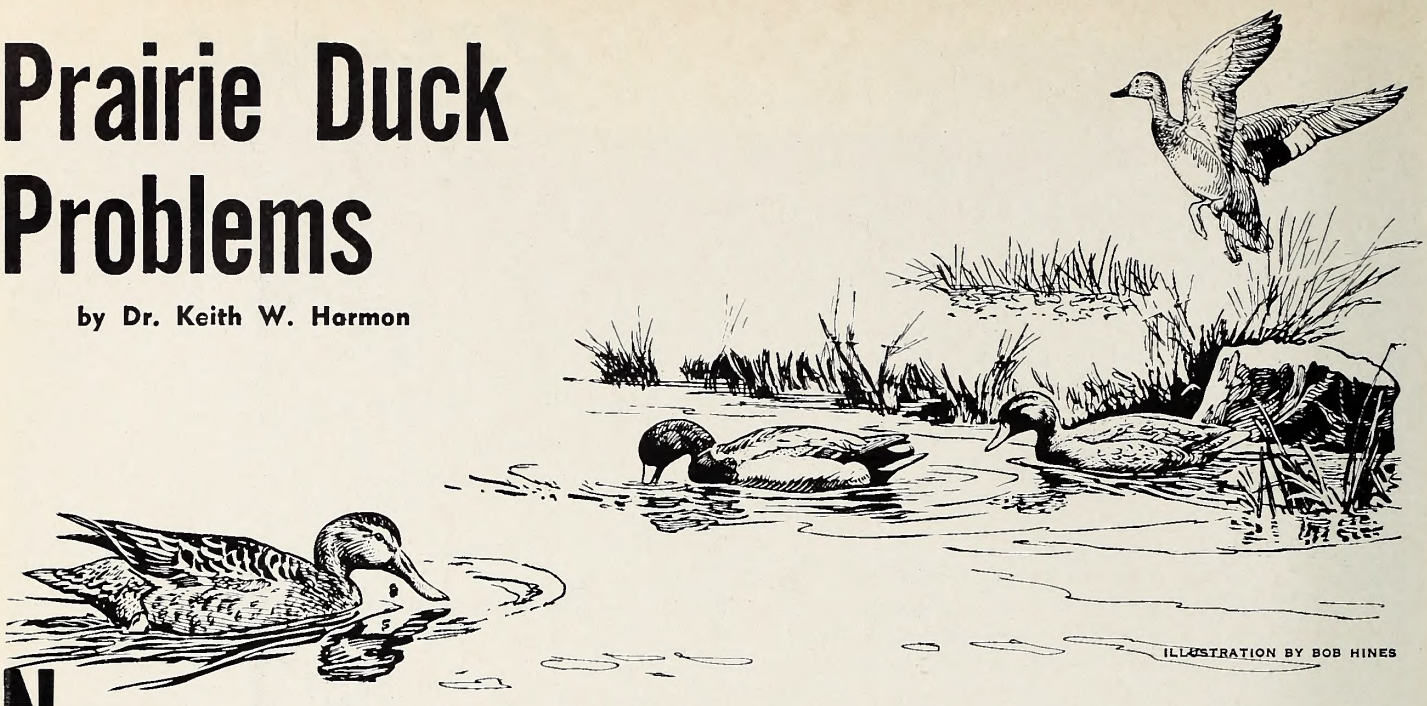

ILLUSTRATION BY BOB HINES

NEW England has its seashore, the West its spectacular Rockies, and the Southwest its colorful deserts. The northern prairies, however, seldom leave the modern tourist awestricken. Highway surveys show that most travelers passing through the Dakotas are doing just that—passing through, and quickly.

Few of the speeding tourists realize they are passing through a valuable and interesting biological phenomenon, a galaxy of marshes, ponds, and small lakes known as prairie potholes. Little understood, less appreciated, but with their own intrinsic beauty and bursting with life, these reed-rimmed basins are as typical of the northern prairies as the mountains are of the West and the seashores are of the Northeast.

Prairie potholes are scattered over some 300,000 square miles of North America, of which about 60,000 square miles lie within the United States, mostly in the Dakotas but including a significant part of western Minnesota. In Canada, the pothole zone stretches from southwestern Manitoba through southern Saskatchewan into southern Alberta.

During the Ice Age, this land was shaped and reshaped by massive glaciers that ground large chunks of ice into the earth. When the glaciers retreated, the buried ice chunks melted, leaving behind small basins—the potholes. One hundred or more basins per square mile are common. Each pothole fills from rain or snow falling on the surrounding few acres, and empties by seepage of the water into the soil, by evaporation, and by transportation of the water through plant leaves. No streams lead into or out of the ponds, unless man intervenes with a ditch. Ideal conditions for filling potholes with water consist of fall rains frozen into the topsoil by a hard frost and followed by a heavy winter snowpack. When the snowpack melts in the spring, the meltwater cannot percolate into the frozen soil, so it runs readily into the potholes. At any time of year, heavy rains producing plentiful runoff can replenish the potholes.

Tallying pothole areas is a formidable task, but estimates made in 1968 for the Dakotas and Minnesota place the figure in excess of 3 million acres. Prairie wetlands come in all shapes, sizes, and kinds, but they are of four main types. The first type is temporary wetlands, the field puddles that hold water for a few weeks as the snows melt or after heavy rains. Dry the rest of the year, temporary wetlands usually are farmed. Then there are semi-permanent wetlands, shallow marshes that contain water in most years until July. The other two types, deep marshes and open water areas, hold water except in the driest years.

Wetlands play a vital role in the lives of nearly all forms of prairie wildlife—from bobolinks to pronghorns. However, most closely tied to wetlands are the ducks and other aquatic birds. The prairie pothole country contains only about 10 percent of the available duck nesting habitat in North America. But that 10 percent produces 50 percent of the ducks raised in North America in an average year! It is aptly called the "duck factory of North America." Let the pothole country go down the drain, and we must settle for a duck population one-half or two-thirds smaller than what we have today.

The effect of losing the prairie potholes on North American duck populations was clearly demonstrated in the "dirty thirties." Prolonged drought plagued the prairies. Potholes dried up. Temporary wetlands went first, then the more permanent ones. Finally even deep prairie lakes were waterless. As the drought's grip tightened, duck populations skidded to an all-time low. Only the return of life-giving rains reversed the trend.

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Even today potholes are periodically dry. This condition should come as no surprise. They are located in a region that historically was clothed in grasslands, and grasslands develop under semi-arid conditions. When ducks arriving on their ancestral breeding grounds find poor water conditions, they tend to move north into Canada where water levels are more stable. Unfortunately, many breeding pairs there do not get down to the business of raising ducklings as they do on their native prairies.

If drought is common on the prairies and bad for the returning ducks, why are prairie potholes so important? The answer lies in the fact that though seasonal duck populations are reduced by an occasional drought, the dry spell can be a blessing in disguise. Periodic drying and flooding of wetlands are the key to long-term duck reproductive success. Temporary wetlands go dry every year and shallow marshes about six years out of ten. Exposing pothole bottom muds and vegetation to the air causes nutrients to be released. When the ponds and marshes are reflooded, plant and insect life increases rapidly. An abundant supply of insects is then available for food when ducks arrive on the nesting grounds. Insects are thought to be important as a source of protein for maximum egg production.

Ducks need privacy, particularly during courtship on the prairies. Besides providing food, temporary wetlands spread breeding pairs over the landscape for maximum isolation and privacy. Thus, permanent wetlands produce more ducks if temporary wetlands are nearby.

Shallow marshes, in addition to having high insect populations, have heavy growths of emergent vegetation because of periodic drying. When they are reflooded, this vegetation offers protection for young ducks during their early lives. Each marsh is a natural duck hatchery providing abundant shelter and plenty of protein. Man, for all his knowledge, could do no better. Deep marshes and open water areas provide more permanent water where ducklings can develop to their flight stage, protected from predators, after the less permanent wetlands go dry.

As winter begins to descend on the prairies, these wetlands assume other values. They serve as resting and feeding areas for migrating ducks as they move to their southern wintering grounds. Later their weedy shorelines provide winter havens for pheasants, prairie chickens, and other grassland wildlife. The key to wildlife abundance on the prairie is large numbers of wetlands and different kinds of wetlands, subject to the periodic drying and flooding of the natural cycle.

Much is known about duck biology, and much remains to be learned. To our good fortune, ducks have handled their own management for thousands of years—doing a respectable job of it at that. But waterfowl have no control over the fate of the wetlands that they so desperately need.

"Progress" has reached the prairies. A duck is no match for a man equipped with modern machines and technology. Possessing these forces, man is causing permanent drought by ditching and draining the potholes. When the rains return, ditched wetlands are no wetter than the surrounding fields.

Reclaiming wetlands for growing crops is probably almost as old as farming. It is certainly as old as agriculture on the prairie. Early soil surveys in Minnesota mentioned tile drainage before the turn of the centry. The acreage of prairie wetlands so far drained, at both public and private expense, is staggering. By 1950 about half the wetlands in the United States' share of the pothole country had been drained.

Under our present system of land ownership, there is little to restrict private drainage. In fact, most state laws encourage it.

Progress in reorienting outdated state laws has been slow to nonexistent, and state policies have wavered. The director of Minnesota's Division of Lands, Minerals and Waters, for instance, recently has given attention to the nonagricultural values of wetlands. But other officials seem unconcerned. Unfortunately or fortunately as the case may be, directors are subject to replacement as each new governor is elected. Specific legal guidelines are needed, as each director has a different philosophy toward potholes.

The most controversial issue involving wetlands has been U.S. Department of Agriculture (USDA) payments to landowners for drainage and the consequent destruction of public values primarily for private gain. These payments are made through the Agricultural Conservation Program. Engineering assistance is provided by the Soil Conservation Service—the technical arm of USDA.

As early as 1949, federal payments for drainage were in the limelight. An article in *Field and Stream* magazine pointed out that in Day County, South Dakota, USDA in 1948 had paid 350 farmers $17,285 for constructing 43 miles of ditches to drain 1,400 potholes. In Minnesota and the Dakotas, 64,000 individual marshes were drained in 1949, all with federal assistance. From 1953 to 1961, subsidies were paid for drainage of an average of 9,885 acres of wetlands per year.

Because of public opposition to drainage, Congress passed PL 87-732, which required the Interior Department to investigate the requests for federal drainage payments in the Dakotas and Minnesota. If a drainage request is denied, Interior must offer to pay for an easement that restricts drainage or to buy the land. The landowner may refuse, but if so, federal assistance for drainage is denied for 5 years. The 5-year waiting period on many wetlands has already expired. As yet there

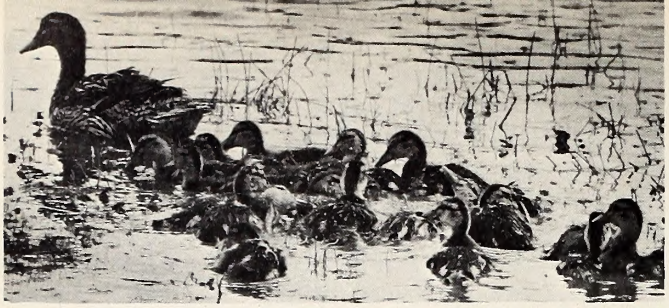


PHOTO BY JOEL ARRINGTON

Without adequate water and favorable nesting conditions, duck production simply isn't possible. All other management endeavors have little effect unless suitable nesting grounds are maintained.

is no evidence that the federal government is paying for draining these wetlands. However, there are plenty of signs to indicate that as the 5-year restriction runs out, cost-shared drainage will again be in fashion.

To further underscore its intent that federal money should not be spent to destroy valuable wetlands, Congress passed the Reuss Amendment in 1963. Through an annual amendment to the Agricultural Appropriation Act, this law prohibits cost-sharing drainage of shallow marshes, deep marshes, and open-water areas nationwide.

Even with these restrictions, drainage is still considered in agricultural circles as an approved land management practice. Therefore, problems and debates persist. As an example of the problems still faced, it is the wildlife agency that must inform the landowner when drainage payments are denied because of Interior Department objections. Thus, the gap between wildlife and agricultural interest widens, making wetland preservation even more difficult.

The Soil Conservation Service, through its own interpretation of the law, provides engineering assistance to the landowner if other than Agricultural Conservation Program funds are used for drainage. Engineering is expensive, and free help gives the landowner an incentive to drain wetlands even though no money changes hands. Just an engineer's comment, "You can easily drain that wetland in that direction," is enough to have the plug pulled on a valuable pothole. This brings heavy equipment into an area, which in turn provides a stimulus for additional drainage. Contractors work more cheaply if they can stay in an area and avoid moving costs.

One unfortunate aspect of the pothole controversy is that it has brought ill repute to what was originally supposed to be a conservation program. Many good conservation practices are supported by the Agricultural Conservation Program, such as tree planting, strip cropping, terracing, contour plowing, and installing livestock ponds. However, drainage is a land improvement practice having as its ultimate object not conservation but more crop production. The President's Advisory Commission on Food and Fiber has clearly stated that drainage is not a conservation practice and should be discontinued.

It is difficult to justify strictly agricultural programs based on increased crop production through drainage in the prairies when the Dakotas and Minnesota have over 10 million acres of land retired from production under the federal farm program. Rather than promote drainage, federal conservation agencies should push wetland maintenance programs.

The entire Agricultural Conservation Program was in serious trouble in 1970. President Nixon's recommended agriculture budget contained no funds for the Agricultural Conservation Program. Although he finally approved that portion of the farm program, he commented that it had become dominated by crop production practices and no longer was truly a conservation program.

In light of these developments and the legal restrictions imposed on cost-shared drainage by Congress, it is difficult to understand why drainage is still sponsored with taxpayer funds. The answer is that there is a loophole—flood control. In 1954, Congress brought a glimmer of hope for sound management of all prairie resources when it passed the Small Watershed Protection and Flood Prevention Act. During House debate, the statement was made: "Simply stated, the purpose of such legislation is to stop water where it falls, to store surplus water, and to release it slowly."

In 1956, the bubble burst. (It had previously had a few slow leaks anyway.) During Senate debate on a proposed amendment, a statement was made that "flood control" should be construed to mean not only land treatment and small detention reservoirs, but also drainage channels to remove excess rainwater or overflows from flat lands. This one statement has been seized upon as a mandate to include drainage channels in all small watershed projects.

It has been argued that a natural stream that has been straightened, widened, and deepened to handle flood waters does not *directly* contribute to drainage of potholes. However, there are no legal restrictions to prohibit landowners from draining their wetlands into the taxpayer-financed channels. If by digging a ditch for "flood control," the federal government has reduced considerably the distance a landowner has to dig his pothole drainage ditch, the landowner might as well have received a direct drainage subsidy. Drainage, be it "direct" or "indirect," removes important wetlands from the landscape.

Private drainage surveys made in the Dakotas and Minnesota by the Bureau of Sport Fisheries and Wildlife show that approximately 125,000 acres of shallow marshes, deep marshes, and open-water areas were drained from 1965 to 1968. Channels constructed in small watershed projects and flood control projects of the Army Corps of Engineers, local highway ditches, and other ditching systems were used as outlets for draining these wetlands.

New highway construction in the prairies threatens vast numbers of wetlands. Less obvious a threat

than ditches dug solely for drainage, these projects can place drainage outlets within easy reach of most landowners. Federal funds go to both county and state highway departments to help expand the road system. Along with the money come certain engineering specifications conducive to increased drainage.

As part of these construction projects, roadside ditches are reshaped so runoff reaching the ditches will move to the nearest creek or river. A recent 6-mile road construction project in the Dakotas illustrates the point. The roadside ditch provides the outlet for rapidly removing water to a nearby river. Since it was completed in the fall of 1970, landowners have already ditched many permanent wetlands into the highway outlet.

Aerial photographs of the project show that within one-half mile of each side of the road and one-half mile past each end (7 square miles) there are (or were) 416 individual wetland areas. The wetlands totaled *1,018 acres*. The opportunities for wetland drainage provided by this one small project are unbelievable. Recent studies of duck production in this general area show that approximately two ducks per acre are raised on such wetlands. This means that a single road construction project, 6 miles in length, is now in the process of eliminating waterfowl habitat that produced more than 2,000 ducks per year. And the taxpayer footed the bill!

Once the public helps pay for establishing drainage, by whatever route the payment is made, the paying does not end. A landowner can deduct the costs of drainage from his income tax if the cost does not exceed 25 percent of his gross income. Amounts exceeding 25 percent can be carried over and deducted the next year. The cost of maintenance is likewise deductible, except there is no 25 percent limitation.

Prairie wetlands, then, are faced with a combine of cost-shared drainage, free engineering services in small watersheds, "flood control" drainage ditches, road construction projects, private drainages, and tax writeoffs. Existing official attitudes and programs, both federal and state, must be reoriented to maintain these important wetlands. They must be based on ecological soundness, not environmental degradation and destruction.

Programs that leave the landowner with unrestricted choice between conservation practices and agricultural production practices are no longer in the public interest. Furthermore, there is little rationale in spending tax dollars for production when true agricultural conservation programs are wanting. North Dakota, for example, ranks either first or second each year in the number of acres damaged by wind erosion.

It is likewise questionable for federal money to be spent on road construction that stimulates drainage. It is even more questionable when the construction is being carried out in states that are steadily losing population.

Some gains have been made in preservation of wetlands. In a publication entitled *Land Use and Wildlife Resources,* the National Academy of Sciences listed 83,000 acres purchased in Minnesota and the Dakotas by state game agencies, another 86,000 acres purchased by the Bureau of Sport Fisheries and Wildlife, and Bureau easements restricting drainage obtained on about 500,000 acres of essential wetlands. In addition, Congress passed and the President signed the Water Bill, to begin in 1971. This program would give landowners an annual payment for leaving wetlands undisturbed. It remains still to be funded.

As complex as preservation of wetlands seems, it can be accomplished—if the public wants it to be. To this point, efforts for wetland preservation have been somewhat delaying actions. A three-point approach is needed if sufficient wetlands are to be maintained in real security. First, we must decide how many wetlands are needed. According to a report on fish and wildlife resources in the Souris-Red-Rainy River Basins in the heart of the United States pothole country, "Demand in all basins for hunting is substantially above capacity of the resources to support it at the desired quality level." In addition, half the U.S. pothole acreage already has been drained. The answer to how many wetlands must be saved is obviously *all.* Attaining this goal may not be possible, but nevertheless it is the right answer to the question.

Second, once we establish and accept the goals, we have to remove stumbling blocks such as federal drainage and drainage incentives. These incentives must be eliminated from the Agricultural Conservation Program, small watershed and flood prevention projects, road construction, and income tax deductions. This part of the solution lies with the taxpayer. For one thing, the taxpayer must insist that his money not be wasted on paying landowners for doing things that return a direct profit to the landowner while destroying public values. On the other hand, maintaining productive farm land and preserving wetlands are true conservation endeavors. Meeting these objectives involves long-term investments. Landowners may encounter cash outlays to maintain public values and realize no immediate profits. In such cases the public should help assume a part of the costs.

This brings us to the third part of the solution. If people want wetlands and wildlife to remain a part of the prairie landscape, they will have to help pay for keeping those wetlands that usually provide no immediate income for the landowner. The landowner will not assume this financial burden on his own. According to the old adage, "You get what you pay for"; to date we have paid very little, and that is what we have.

Only by following such a course of action will the prairie wetlands be saved. In the final analysis, preservation of our unique wetland resource lies in the hands of the people, for wetlands are for people as well as the wildlife ⬍⬍

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Fishing Tournament

More than 500 bass fishermen will be angling for a $1,000 first prize in the fourth annual Kerr Lake Fishing Tournament to be held on Kerr Lake April 14-15. The event is sponsored by the Henderson Jaycees. Write Kerr Lake Tournament, Box 197, Henderson, N. C. 27536, for information and entry blanks.

You Can Help Bring Spring

Your help is needed right now in reporting the flowering dates of dogwood or redbud. Send your name and address to the N. C. PHENOLOGY PROJECT, c/o Dept. of Botany, UNC, Chapel Hill, N. C. 27514. Forms and instructions will be sent to you. Look for a full report in next month's WILDLIFE.

N. C Wildlife Federation To Meet in Raleigh

The N. C. Wildlife Federation has scheduled its annual meeting at the Sir Walter Hotel, Raleigh, February 22-24. An interesting and environmentally significant program is scheduled, and a highlight of the meeting will be the annual awards banquet at which special awards will be made to outstanding persons in the fields of Water, Soil, Forestry, Wildlife, FFA, 4-H, Boy Scouts, Conservation, Conservation Legislation, Communications (writing and broadcasting); a Junior Conservationist of the Year, and Conservationist of the Year.

It's All Over But the Gobbling

February 28 marks the end of all Tarheel hunting seasons except for foxes (where local laws may prevail) and wild turkeys. The gobblers-only turkey season will run from April 21 - May 12, with a daily bag limit of one, and a possession and season limit of two male birds. Turkey hunters and biologists agree that the spring gobbler turkey season has had a key role in increasing the N. C. wild turkey population.

Boat Registration Up Again

With 92,607 motorboats registered in N. C. during 1972 another record was set. The 1971 registration figure was 82,938. This indicated a gain last year of nearly 10,000 new registrations. At press time, 41,141 boats had already been registered for the current boating year.

Even-aged Forest Management

Clearcutting—Is It Good For Wildlife?

by George E. Smith
Supervising Forester
Illustration Courtesy US Forest Service

TODAY there is a public awareness of environmental values along with concern for the wise use of our natural resources. As never before, the American people are questioning management practices and land-use policies affecting these resources—and rightly so. Since the environment is used and shared by all, we have a very vital stake in what happens to it. There is also an awareness of responsibility to perpetuate our resources that future generations might have clean air, pure water, and abundant forests and wildlife. Public and private agencies, professional resource managers, and individual landowners are now being called upon to defend management decisions that once were accepted without question.

One of the most debated and controversial questions to surface recently has been the use of "even-aged management," which includes clearcutting, as a forestry practice. At times debate has been heated, especially between professional and nonprofessional interests. Numerous articles have been written; laws have been proposed to regulate its use; and even a clear-cut moratorium has been suggested. Yet, the general public remains confused as to the *need* and *proper use* of this system of management.

Let us consider some of the basic facts which have caused foresters to adopt even-aged management. The first forest management in this country was based on the assumption that trees of all ages could be grown in a single stand. This theory gave us the basis for cutting trees "selectively" as they became mature. The trees that remained were supposed to seed in younger trees and provide future cutting stock. Cutting of selected trees could be continued indefinitely in a given area to provide a sustained yield of timber. This system seemed to be the answer to our forestry needs. However, foresters found that this system worked better on paper than in the field. On many sites, desirable species of trees failed to reseed themselves or grow properly under larger trees. Another failure was that selective cutting often left mostly defective trees to regenerate the forest.

Foresters began to face the fact that our shrinking forest acres, while being called upon to produce more timber for the Nation's needs, were producing less and less. It is of course far-fetched to give selective cutting total blame for this predicament. Many thousands of acres of woodlands were being harvested year after year with no thought of management whatsoever. Sadly, this situation still exists far too often in our forests today. But a better system of growing and managing timberlands was needed, especially where all-aged management was

Even-aged stands—unthinned

Even-aged stands—thinned

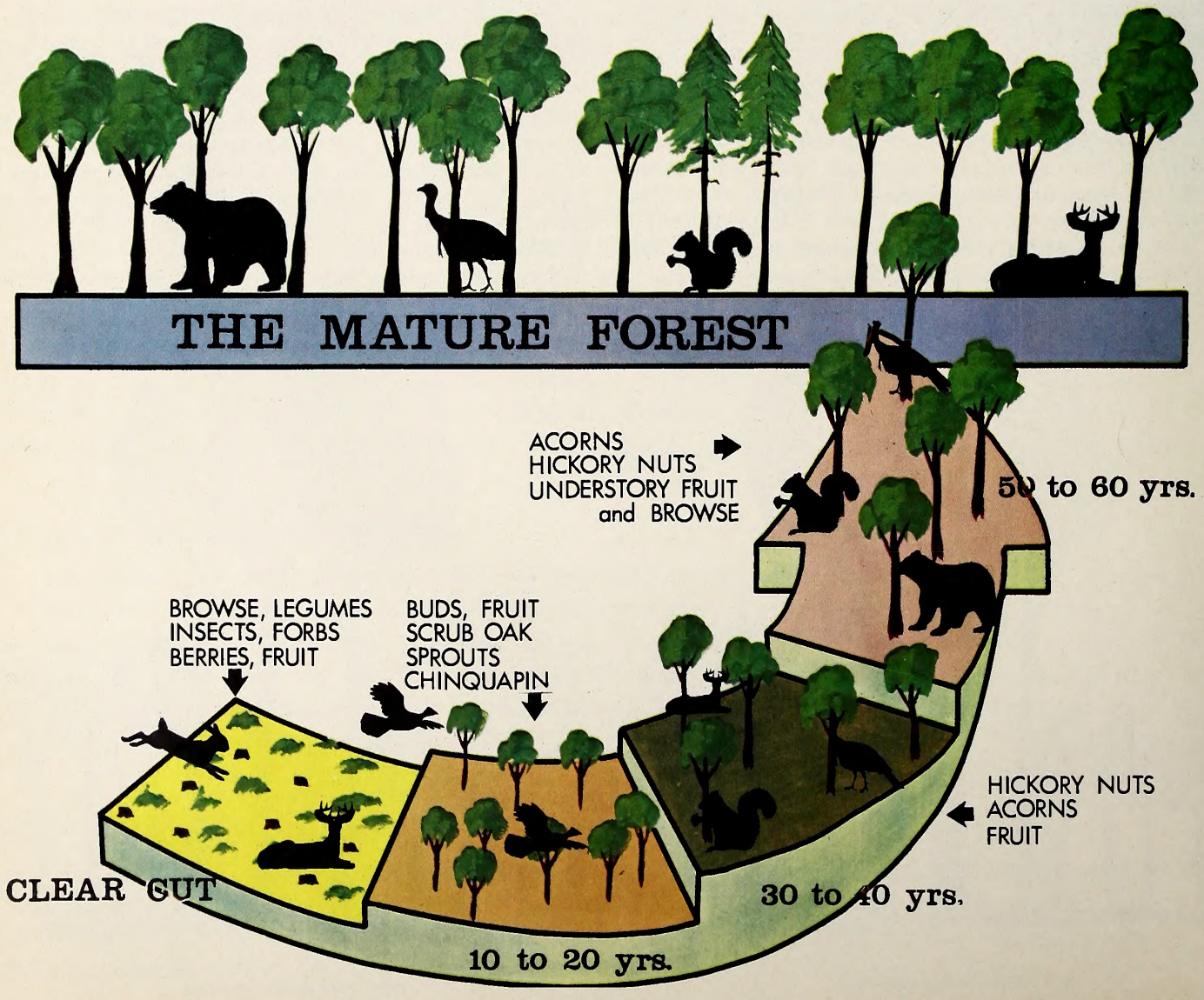
not working. After years of trial, error and research, even-aged management came into wide-spread use.

Why is the even-aged system better in most cases? Because most of our tree species will not grow well in the shade of their neighbors. Therefore, natural stands of trees tend to be of the same age. When we attempt to turn natural, even-aged stands into all-aged forests by selective cutting, the result is a biologically unsound system that just doesn't perform well.

In the even-aged approach, stands receive a series of improvement cuts such as thinnings to improve growth and others to remove disease or undesirable trees. The best trees are always left until they are mature. When a stand becomes mature, all or most of the trees are removed depending upon the regeneration method used. A new stand, with all trees being about the same age, is then started by planting or seeding the cleared area.

Even though the clear-cutting stage of even-aged management is now an accepted practice among foresters, its use has often been opposed by the public. Areas cleared of forest land are, at best, unsightly and often hundreds of acres have been cut and cleared in one large block. Large clearings have not only caused public concern but have resulted in the destruction of important wildlife habitat. And where done improperly on wastersheds, streams have been damaged.

This situation, then, brings up a point that is often raised: is clearcutting for forestry purposes compatible with other land uses? Let's consider the wildlife side of this question. Most of us are familiar with the basic needs of many wildlife species. Squirrels need the mature hardwood forests producing acorns and other mast and providing dens for raising young. Rabbits can survive well in cut-over areas where low cover and food is available. Deer and wild turkey need more of a variety. They like forest openings where browse, insects and various legumes are present. Mature hardwood stands provide important mast crops and they need the escape cover of young, dense stands. Turkeys need cover but they don't like dense underbrush. In order to satisfy the needs of a variety of wildlife, many dif-



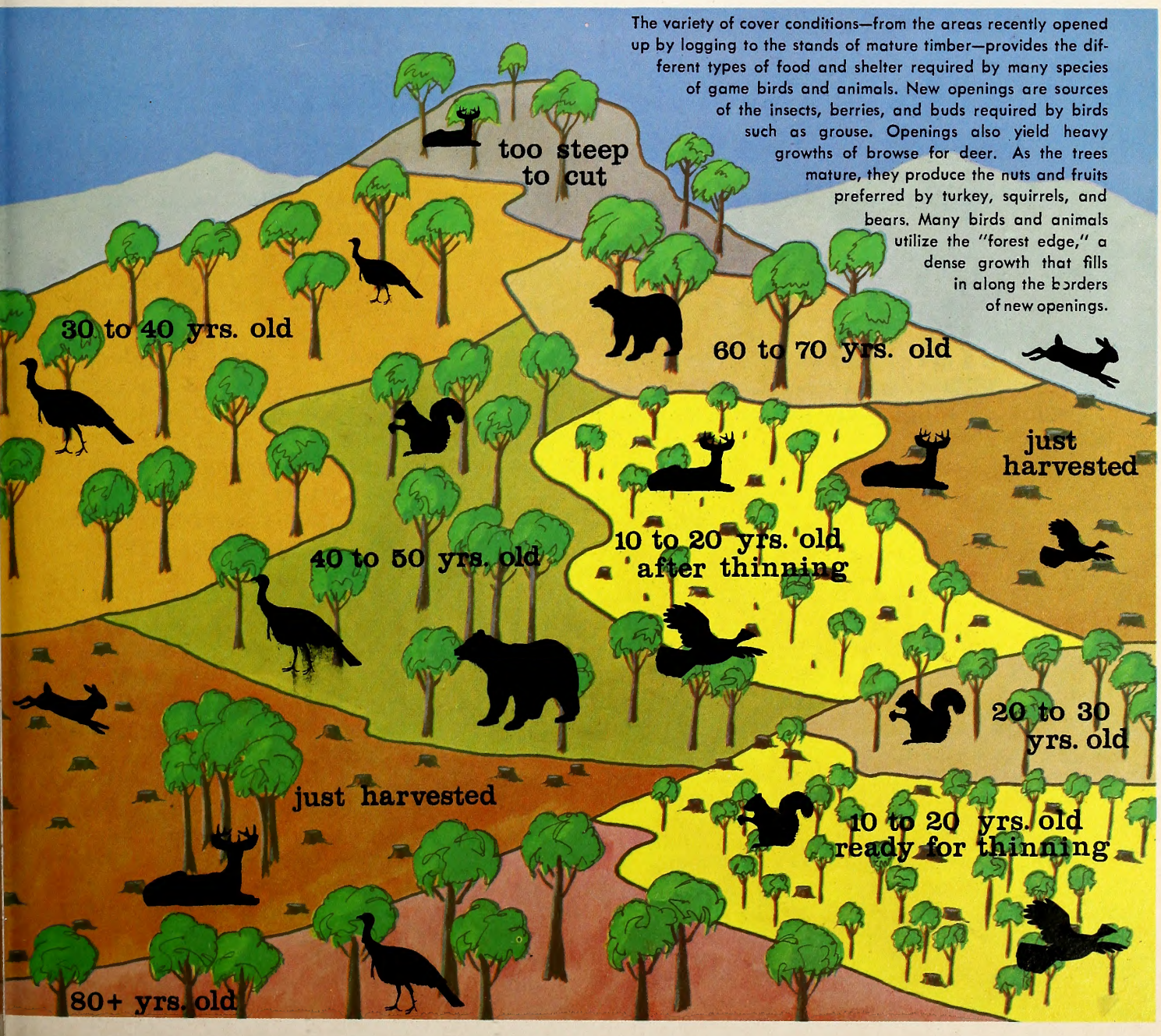
ferent cover conditions are required. Clearcutting, when properly applied in the forest, can provide these various needs.

The key to proper application is reducing the size of clearcuts, careful dispersion of clearings, and planning to preserve special areas vital to certain species. The forester can easily reduce the size of a single clearcut unit without upsetting the over-all plan. This unit might even be 100 acres or less depending upon the situation. Several small-unit cuts prevent the creation of one large block of similar type timber which cannot be utilized by a variety of wildlife.

These cuts also need to be dispersed so that various stages of habitat development from new openings to mature timber stands are available within daily cruising radius of the species of wildlife under consideration. Several small acreage cuts placed side by side within a short period of time are little better than one large clearcut. Due to the need of many wildlife species for acorns, care must be taken to provide for available stands of mast-producing hardwoods as cutting progresses.

The need for special or "key" wildlife areas should not be overlooked. These might include bottomland strips, certain stands of trees where nesting occurs, or they might be a need to leave den trees. The red-cockaded woodpecker, for example, might be driven out of a nesting area unless special care is taken in the cutting plan.

Greenways or uncut strips must be left along streams and further care taken where streams are concerned. These guides give a partial view of the way in which the clearcutting aspect of even-aged forest management can work for wildlife. All it takes is a little planning and cooperation between the forester, wildlife biologist and others interested in promoting the wise use of our forest and wildlife resources. For the good and wise use of all resources, cooperation and planning must be the rule and not the exception in future years. ⬍⬍



The variety of cover conditions—from the areas recently opened up by logging to the stands of mature timber—provides the different types of food and shelter required by many species of game birds and animals. New openings are sources of the insects, berries, and buds required by birds such as grouse. Openings also yield heavy growths of browse for deer. As the trees mature, they produce the nuts and fruits preferred by turkey, squirrels, and bears. Many birds and animals utilize the "forest edge," a dense growth that fills in along the borders of new openings.

The Hunter Belongs

The Wildlife Commission gets a lot of questions. The answer to this one is worth sharing with every reader.

Jim Dean
WILDLIFE IN NORTH CAROLINA
Raleigh, North Carolina 27611

Dear Mr. Dean:

This layman has just completed reading your article "Never Mourn A Dove" in the September issue of WILDLIFE and I am somewhat confused.

On page six of the periodical your article relates: ". . . It has been proven that some 70 percent of the total dove population in this country die each year naturally as part of nature's scheme. Death comes in the form of disease, predation (hawks, owls, etc.) and starvation. This 70 percent will die whether man hunts them or not . . ." You further indicate that mourning doves decimated by man proves merely the birds will not die of disease, starvation, etc., as hunters do not take more than 70 percent of the population. To me, this is somewhat illogical. Inasmuch as 70 percent of these birds die via predators, disease, starvation, etc., would not the percent killed by man be added? I am assuming 70 percent of these birds have always died even prior to the invention of firearms.

Yours cordially,

Larry E. Barnes,
Elon College, North Carolina 27244

Dear Mr. Barnes:

Thank you for your letter about my article "Never Mourn A Dove" which appeared in the September 1972 issue of WILDLIFE IN NORTH CAROLINA. Your letter made me realize that widespread confusion on this and similar points about game management and hunting is one reason the sport has been maligned in recent years. In fact, while writing this letter, it occurred to me that the answer to your question needed considerable elaboration, and should also be read by as many people as possible.

You are correct in saying that about 70 percent (sometimes more) of the dove population has always died prior to the impact of hunting. In biologist's jargon, this control is accomplished by a process called "compensation" or sometimes "substitution."

First, keep in mind that the populations of various species vary naturally—in cycles—from year to year depending upon many factors such as the weather and its effect on breeding success. But, basically, the population of any wild animal or bird is controlled by three things: predation (hawks, owls, foxes, etc.), availability of food and cover and disease. Nature annually takes its toll to keep populations within the natural limits their environment can support.

Take rabbits, for instance. If the rabbit population gets too high, the vast numbers of bunnies will eat more food and find less cover. They may, in fact, eat themselves out of house and home and many will starve. Also, the larger numbers of rabbits attract the increased interest of many predators who take their toll. Also, when the rabbit population is high, disease is more likely to break out and spread rapidly because of the increased contact between the many rabbits, thus further thinning the ranks. These are all natural functions of the natural order of things, and usually, all three factors work together to keep populations in check.

"Compensation" occurs when one or more of these three factors is unable to function for some reason or another. For instance, if there are no predators around to help keep the rabbit population in check, the population is likely to grow to the point that either lack of food or disease strikes even harder to compensate or substitute for the lack of predation.

I know a place—on an island—where for some reason food and cover are very abundant. Also, perhaps because the rabbits are isolated, disease strikes less frequently. However, you would not believe the number of predators attracted to this island to prey on the rabbits, effectively keeping the population in check despite the relative lack of the other two major controls. If the predators were absent, one of the other factors would eventually control the population even on the island. This is "compensation" in action, and as I said, it is completely natural.

It is important to note that the controlling factors cannot overcompensate. For instance, if disease strikes a rabbit population, it kills only to the point where the rabbits are thinned enough not to make frequent contact with each other to spread the disease. It's sort of law of diminishing returns.

Likewise, predators will thin a high population of rabbits only so far because once the rabbits begin to get scarce, the predators find it more profitable to hunt elsewhere. The same setup is true for food and cover. These controls cannot overcompensate. Once the rabbit population is back within the natural limits the range can support, the controlling factors—like disease, for instance—are no longer effective. This insures that a breeding stock is left for next year when the animals may again overpopulate their range until nature controls them.

This system of natural checks and balances works for all species, including doves. In the case of doves, biologists know that predation, availability of food and cover, and disease naturally take an average of about 70-85 percent of each annual dove crop, leaving the remaining 15-30 percent to breed next year's crop. This brood stock is more than adequate for this task, in part proven by the fact that the dove population in the United States is as large or larger than ever before.

The hunter, in the role of predator, could (but doesn't) kill nearly 70 percent of each annual dove crop without hurting future brood stocks. He could do this because if he killed that many, then the population would fall to the point where disease, food and cover and other forms of predation would not be effective, thus still leaving the normal brood stock for the following year. That's why the take by hunters is not added to, but is a part of the annual natural loss of doves.

In fact, a long study by the Southeastern Cooperative Dove Study Group a few years back showed that the maximum kill by hunters was only about 14 percent of the total dove population—well below the level that might take a bite out of the following year's brood stock.

Other forms of predation, food and cover limits and disease annually make up the difference to the natural limit of from 70-85 percent mortality.

As you might have guessed, a problem could arise if man takes more than the natural annual die-off of doves. If he did, he would be taking part of the brood stock necessary to perpetuate the species the following year. Actually, the liklihood is very slim because—like the other controlling factors—man runs into the law of diminishing returns. When the population gets low, the hunter would stop hunting because there would be less chance of bagging his quarry. (When the field mouse population gets low, for instance, hawks and owls move to a more fertile area or seek other food).

There have been times, however, when man did overreach the natural limits and take part of the brood stock. Market hunters did this to passenger pigeons and bison, and they hurt the brood stock year after year, never giving it a chance to recover. Eventually, the inevitable happened, and there are no more passenger pigeons and very few bison.

These examples, however, are rather specialized and deal with the greed of market hunters who couldn't care less about the future of their quarry even if they suspected they were causing its extinction.

continued on page 24

Pine Trees AND Quail

By Charlie Woodhouse
District Biologist
Photos By Luther Partin

YES, I said pine trees *and* quail. I'll have to admit it sounds a bit incongruous since we usually think in terms of having pine trees *or* quail. Have you ever tried to pursue bobwhite quail in a pine thicket? I'm sure you have if you've hunted them in recent years because the singles will head for such thickets like old Maude for the barn at noon time. Now, my forester friends might not aprove of the term "pine thicket." I believe the correct terminology is "pine plantation." But by whatever name, they are the bane of the quail hunters' existence and have been endowed with many non-endearing terms unprintable in this family type magazine.

Before you get the mistaken idea that I am some kind of anti-tree nut let me hasten to set the record straight. Woodlands are as vital to the survival of many wildlife species as are water and air. In fact, mixed stands of pines and hardwoods supply many of the basic food and cover needs of our more important game birds and animals. However, the practice now in general use by foresters and private landowners of clearcutting and replanting to solid stands of pines pretty well removes this type of habitat from the hunting scene. This procedure does create excellent habitat for game for five or six years, but then the pine canopy closes in so as to practically eliminate hunting.

The maturing wildlife food plants established in the "third row" of this stand of pines will make the plantation better suited to small game production. It has great potential.

Sportsmen, do not despair—there is a ray of light shining through the pines! A practice coming into use is the "third row thinning" of pine plantations when they are about 15 years old. This practice provides a pulpwood cutting, improves the stand for growth, and opens up a whole new world for the hunter. Instead of these areas being "out

Before

After

Plot No.	Species	Seed Rate/Lbs.	Site Preparation	Fertilizer Type	Fertilizer Rate/Lbs.	Results
1	*** NCWC Perennial Mix	6	Double Disced	2-12-12	200	Good
2	*** NCWC Perennial Mix	6	Double Disced	2-12-12	200	Good
3	** NCWC Annual Mix	10	Double Disced	10-10-10	400	Good
4	Rice Beans	5	Double Disced	10-10-10	400	Poor
5	B.T. & Pro. Millet, Eqt. Wheat	5	Double Disced	10-10-10	400	Good
6	German Millet	10	Double Disced	10-10-10	400	Fair
7	Sericea Lespedeza	6	Double Disced	2-12-12	200	Good
8	Cowpeas	15	Double Disced	10-10-10	400	Poor
9	Soybeans	15	Double Disced	10-10-10	400	Poor
10	Sericea Lespedeza	6	Double Disced	None	0	Good
11	B.T. & Pro. Millet, Eqt. Wheat	5	Double Disced	None	0	Fair
12	Rice Beans	5	Double Disced	None	0	Poor
13	** NCWC Annual Mix	10	Double Disced	None	0	Fair
14	Shrub Lespedeza	2,000	None	2-12-12	200	Good
15	Check	Seedlings	Single Disced			Fair

** — Includes a seed mix of cowpeas, soybeans, grain sorghum, buckwheat, Korean lespedeza, and millet.
*** — Includes a seed mix of shrub lespedeza, reseeding soybeans, rice beans, annual lespedeza, reseeding cowpeas and partridge peas.

This 15-year old pine plantation (left) isn't exactly a biological desert, but even the dogs seem to sense that hunting is rather futile. A "third row" pulpwood thinning has opened up this pine plantation (above) and the addition of supplemental wildlife food plantings has created excellent hunting opportunities.

of circulation" for 25 or 30 years, they can be hunted again in half that time. Of course, there is practically no food for wildlife under these thick stands of pines. However, supplemental plantings can be made where the third row of trees is removed, and this brings us to the crux of this article.

In the spring of 1972 the author and Fred Liverman, Cooperative Forester with Albemarle Paper Company, established a series of experimental wildlife plantings in a thinned pine plantation in Halifax County. The company supplied the equipment, manpower and fertilizer and the Wildlife Commission supplied the seed and technical assistance. The row where the trees had been removed was cut with a heavy disc pulled by a crawler tractor. This operation chopped up the pine laps and debris in the row and provided a good seed bed.

This was strictly a learning experiment since we did not know what, if anything, would grow under these circumstances. We planted a variety of materials in several combinations as shown in the chart. We realize this was a very limited experiment and with only one season's growth it is difficult to arrive at any firm conclusions. However, we were quite pleased and surprised with the results of some of the plantings, particularly the shrub lespedeza, perennial seed mix, annual seed mix and sericea lespedeza. One very obvious result was the increased food production of the fertilized plantings over the unfertilized ones.

Results of these plantings were so encouraging that the Albemarle Paper Company is budgeting money for more such plantings during this next season. We plan to work with them to develop the best procedures and planting materials. It is hoped these efforts will lead to such programs being adopted by other companies as well as individual landowners. Certainly the Albemarle Paper Company is due a vote of thanks from the sportsmen of North Carolina for taking the lead in developing a real multiple use concept in their woodlands program.

COUGAR—
Villain or Victim

by Betty R. Ford
Hickory

ILLUSTRATION BY REX SCHMIDT

THE cowboy rides cautiously into the box canyon. He stops, dismounts—tries to locate the tracks of the cat dragging its prey over the rocky ground. Unless he gets this killer, he will lose his ranch. Fifteen steers out of his dwindling herd have disappeared in the last month. This is the first time he has been able to trail the cat this far. His horse is skittish. The cougar must be near.

He grabs his 30-30 from the saddle scarbard, ties his trusty horse to a tree and starts out on foot. The cougar could be anywhere in the rock outcroppings. In the dusk, the tracks have vanished. Which way did he go? Where is he lurking?

A snarl comes from over the rancher's head. Unseen on the tree branch, the cat is poised to spring. Jumping to the side, the rancher slings the rifle to his shoulder and fires. The cougar, still snarling, drops at his feet.

And another western villain bites the dust.

But is he really a villain or is he a victim of fiction lore? Facts must be separated from the fiction to clearly learn about this cat which is facing possible extinction. Information from various reliable sources concerning the cougar's habits must be studied and pieced together, then from the total picture of fact only, can a conclusion be drawn.

Three centuries ago, the cougar was the most wide-ranging large predator in the New World. Once they were native from the Pacific to Atlantic and Gulf Coasts, from British Columbia to New Brunswick and south to Patagonia. Cougars no longer live over most of the United States and adjacent Canada. Between 100 and 200 of them survive in the Everglades and perhaps 5,000 in the western mountains, in the Idaho Primitive Area and the Gila Wilderness Area of New Mexico. Reports of their survival have come from the bayous of Louisiana, the Great Smokies of western North Carolina and the Shenandoah National Park in Virginia.

Are there still cougars in North Carolina? Newspapers report areas where they are suspected of killing livestock. However, no cougar has been spotted or tracks seen to verify these reports for approximately 30 years in this state.

The cougar is a "protected animal" in North Carolina, as well as in many other states. Only Texas and Washington still maintain a bounty of $100 on their hides. Though shooting or trapping these animals carries a $500 fine in North Carolina, they may be killed if caught in the act of destroying an owner's livestock. If the predator has left the scene of the crime, a permit must be secured to hunt or track it down.

The cougar is known by many regional names, among them are mountain lion, puma, panther, painter, leon, catamount, el lione and king cat. In appearance, the cougar is an impressive animal. They stand approximately 2- to 2½ feet at should-

er height and average a length of 7- to 7½ feet, with a tail of three feet, and have been reported as big as nine feet long. They weigh up to 200 pounds, averaging 150-175 pounds, the males being larger than the females. The cougar's fur is relatively short, close and uniformly yellow-brown, darker above and lighter beneath with dark points on the muzzle and ears. As with others of the cat family, their claws are retractile and whiskers are prominent.

Cougars pair and both care for the one to five young, which are born anytime of the year, 91 days after breeding. The kittens are blind eight to nine days, cut first teeth in 18 days and crawl at seven weeks. They suck meat at nine weeks, eat at three months and are weaned at three to four months. Black-spotted over yellow colored for the first two to 18 months, they leave their mothers at one to two years of age. The cougar's life span is up to 20 years.

The scream of a puma in the mating season has scared many first-time listeners. It is loud, piercing, prolonged and has the agonized voice qualities of a woman screaming in pain. It easily carries a quarter of a mile.

These large animals have the same temperament of their small cousins, the house cat. They are sanguine, good-natured, quiet and peaceful. Rarely has one been known to attack a person, even a child, unless in the vicinity of a den where helpless young need protection. As any animal, large or small, they will defend their young or themselves when cornered.

The cougar drops on his prey from above, landing on the back and lays hold with teeth and claws, biting the neck. Only one out of four of these surprise leaps is successful. They can jump up 15 feet or down 60 feet in safety. Cougars do not kill unnecessarily, only for food every night or two, often traveling 20 miles a night to hunt. Eating seven to eight pounds of meat, they cover the rest of the kill with leaves.

Each cougar or pair ranges a set territory of approximately 50 miles without interference from others. In this, these cats police themselves from overpopulation and starvation from lack of sufficent prey in the area.

Recent studies, made in the Wilderness Area of Idaho, revealed that while mule deer and elk are their principal prey, cougars also dine frequently on jack rabbit, snowshoe hares, wood rats, squirrels, mice, and occasionally on grasshoppers. In areas where the cougars have been destroyed, the grasshoppers and mice overrun without check and vegetation is cropped too close by overgrazing from deer for use by man's animals.

Ironically, the cougars have been killed to protect sheep, poultry, cattle, horses and mule deer, also to eliminate the attacks of this large, docile cat to man. It seems that any animal that is large or which man has found no immediate use for his own needs, has been destroyed as non-useful. In these unthinking acts, man has unbalanced nature's scales against himself. These large animals that he has destroyed for his convenience were the predators on the small animals which man has yet to control and they reproduce without fear in our fields and sometimes in our homes.

Cougars prefer moose as prey but as the moose is considered a prize game animal, the hunters here have changed the diet of the predator. By reducing the herds of moose from the swamp in which they dwell, man has helped the deer herds increase until there are more deer today than there were when the Pilgrims landed. The elk, too, are less conspicuous today, and also have relinquished their grazing lands. Now deer have a population explosion. They often overgraze and wear out their feeding areas. They must be reduced by hunting (even either sex hunting) to maintain a balance of deer per square acre, so that they will not all die of starvation.

Between 1906 and 1931, the predators of mule deer were eliminated in the Grand Canyon National Game Preserve. Of these whose diet consisted mainly of the deer, 816 cougars were killed. Now the mule deer is safe and plentiful—as are the mice and grasshoppers.

Later studies show of mule deer and elk killed, from 62 percent to 75 percent are less than 18 months or more than nine years old. In each category, at least half were suffering from malnutrition —and they would have died of starvation in late winter. When a cougar makes a kill, the herd leaves the area, thus allowing the vegetation to recover. Thinning herds kept the population down and increased the deer's chances of survival.

Strangely, in the areas where the cougar was slaughtered to protect livestock, today the horses are replaced by tractors, and there are few sheep and cattle as the land never was suitable for good grazing. Livestock has always been a last resort as a cougar's prey. In old age or when injured so that they are unable to catch their regular diet, they have been known to attack unwary horses and sometimes cattle.

So this majestic animal has decreased in number. They have been pushed back by civilization, by unfounded fears and faulty reasoning. Are the 5,000 in the west counted like the alleged cougars in North Carolina? Will man continue to destroy this wild animal until they only are found tame in zoos or stuffed in museums? Will they become extinct from TV commercials and westerns because no new footage can be shot—anywhere?

Man entered the New World and became the recipient of new species of many animals and birds—with these came the responsibility for their protection and preservation. We have anti-pollution, ecology, clean water, clean air, anti-litter. We must stress wildlife protection for these endangered species. We must preserve the world as we know it and make it better—not less. The cougar, a victim of our imaginations, must be ensured of survival. All animals, predators as well as pets, have a place in our world and a reason for being. ⬍⬍

Tarheel Timberdoodles

by Jim Dean

What's A Nice Bird Like You Doing in A Place Like This?

WE were sitting around the stove in the country store eating slabs of rat cheese and Vienna sausage. There were four of us, and we had been hunting all morning.

"You fellows have any luck this morning?" asked the store's owner as he ambled over to join us at the stove.

"Yes, pretty good," somebody answered.

"You rabbit hunting or quail hunting?" asked the proprietor.

"Woodcock," we said.

"Ah yes, woodcock," said the store owner as he readjusted his cap and took a chaw of Redman. We all sat quietly eating for awhile, and finally as we were getting ready to go, the proprietor shifted the chaw in his mouth and said, "You're the first woodcock hunters we've ever had around here. I didn't even think those things came out of their holes this time of year?"

I'm sure of two things. The owner of the store thought we were pulling his leg, and second, he had confused woodcocks with woodchucks. No doubt we could have cleared up the matter by telling him we were snipe hunting. It would have been untrue, but at least he would have gotten a closer idea of what we were up to.

The fact is that the store owner's reaction was pretty typical. There are very few hunters in North Carolina who know that woodcocks—or timberdoodles, as they are also called—are often plentiful in the state. Any long-billed bird that is accidentally flushed by quail hunters is usually called a snipe. In some cases, the term is correct because the Wilson's snipe is a winter visitor to the state. But the Wilson's snipe is not the same bird as a woodcock, and except for the long bill, the birds are quite different. Snipe are smaller and more darkly colored than woodcocks, while woodcocks are buff-colored and as large or larger than bobwhite quail.

Most Tarheel hunters think of the woodcock as strictly a Yankee. Certainly that was true in my case until recently. I used to associate woodcock hunting with the New England states where timberdoodling is as traditional as eggnog at Christmas. What I didn't realize was that these birds spend only part of their time in the northern states.

Being migratory, both woodcocks and snipe travel north for the summer and south for the winter. Most merely pass through North Carolina, but at times, quite a few spend the winter here. And yet, they are rarely seen for two reasons. First, they migrate at night, and also, they prefer the marshy bottomlands along creeks where they can use their long bills to root out their favorite food which happens to be earthworms. Because woodcocks are usually in thick, swampy cover, most quail hunters do not run across them often unless they happen to be hunting singles in the bottomlands.

In times past, I can recall flushing an occasional woodcock—which I erroneously called a snipe—while bird hunting with my dad and grandfather, but we always figured it was mere coincidence.

A couple of years ago, Frank Barick, who is chief of the Division of Game for the N. C. Wildlife Resources Commission, finally showed me what I was missing.

"Woodcocks are the most neglected gamebirds in the state," Frank explained. "At times during the winter, many parts of the state are lousy with timberdoodles, but very few people know they're there, and fewer still hunt them.

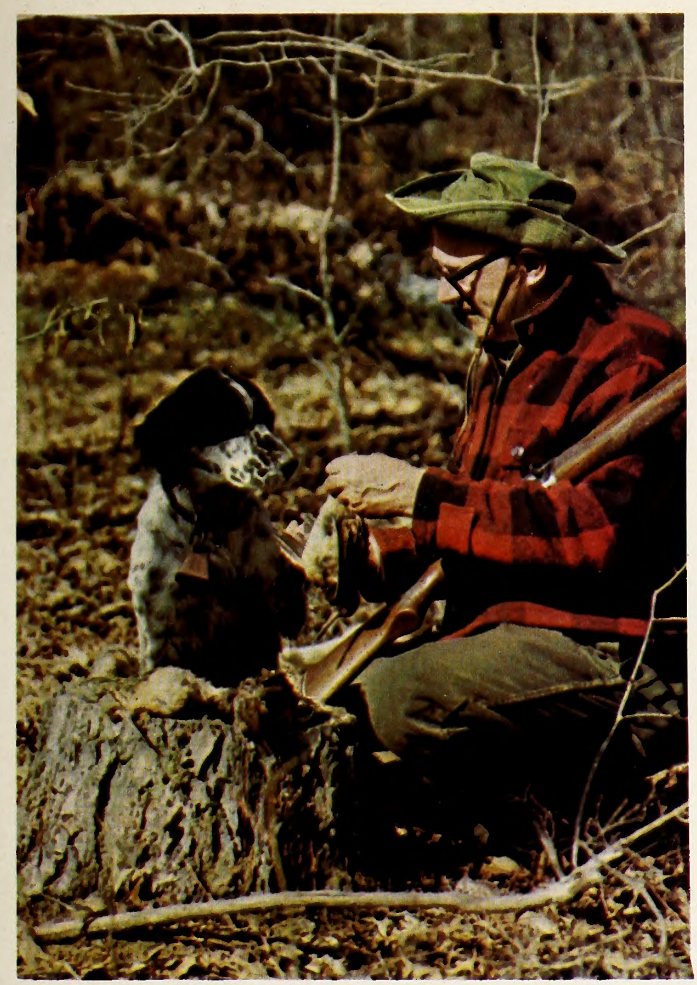
"During the fall, woodcocks are numerous throughout the coastal plains, particularly in the edges of swamps where the ground is soft. In the Piedmont, woodcocks are more often found along creek bottoms. It is not unusual to get a limit of five birds in an afternoon and flush two or three times that many.

"Later on, during colder weather, woodcocks often leave and go farther south," added Frank. "This is particularly true when the ground freezes hard for several days, thus preventing the birds from feeding."

Most hunters will recall that the winter of '71-'72 was an unusually mild one. It was so mild that when the woodcock flights arrived in the state in the fall, many of them stayed all winter. It was during this remarkable season that Frank introduced me to my first taste of woodcock hunting.

We hunted the creek bottoms near Raleigh using Frank's two fine bird dogs, Harry and Tiny. Tiny is dead now, but while she was alive, she and Harry put us into some mighty fine shooting.

One afternoon, Frank and I hunted the huge bottomland along New Hope Creek in Chatham County. This is the area which will be flooded when the U. S. Army Corps of Engineers finishes building the controversial New Hope Dam, and when the area is flooded, one of the best hunting areas in the state will be gone forever.



The woodcock has several distinctive features that make his identification fairly simple; the unusually long bill, which is slightly flexible, the compact, almost round body, and the big eyes.

PHOTOS BY JIM DEAN

A good dog, familiar with the traits of woodcock makes finding the birds easier and certainly more pleasant. The coloration of the bird (opposite page) serves to hide him well among the leaves.

That first afternoon when Frank took me into New Hope, his dogs were pointing timberdoodles before we were out of sight of the car, and we had steady shooting all day long. When a woodcock flight is in the area, hunting can be incredibly fast —even faster than bobwhite quail hunting.

We found most of our birds in the wooded areas along the edges of the creeks. Yellow birch thickets are promising, but so are mixed pines and hardwoods, especially where there is a lot of greenbrier and other thick cover.

Although I have seen a few woodcocks run in front of the dogs, most stick better than quail. In fact, it is not unusual to spot the bird sitting in front of the dog, and on at least one occasion, I was able to photograph a woodcock before we flushed him.

Timberdoodles have a reputation for being hard to hit, and it's true that they dart and zig-zag through the underbrush. But—and this is only my opinion—I find them no more difficult to hit than quail. I suspect it's because I can concentrate on only one bird rather than trying to pick out a bird from a covey.

If woodcock hunting sounds like the kind of sport that might appeal to you, then there is no reason why you shouldn't give these fine gamebirds a try. If you own a good quail dog, he will almost assuredly hunt and point woodcocks, although he may decline to retrieve them. Also you will have very little competition from others hunters. Frank believes there are probably not more than a hundred woodcock hunters in the state.

The best technique—particularly until you learn the location of some hotspots—is to drive along country roads until you cross a sizeable creek bottom. Then get permission to hunt from the landowner and hunt the lowlands. If the weather has been above freezing in recent days, particularly in early winter, chances are you will find timberdoodles. However, woodcock hunting is usually poor following several days of freezing weather.

Perhaps the most pleasant surprise in store for the new woodcock hunter comes after the hunt is over. To me, no species of wild game affords better eating. Woodcocks have dark meat, and to me they taste like delicate duck. Most experienced woodcock hunters pick the feathers from their birds, leaving the skin on, while others skin them like quail. Either way, cook them using your favorite quail recipe.

Unless I badly miss my guess, once you've had a taste of woodcock hunting—and a taste of the bird itself—you'll be spending more time timberdoodling in the future. In fact, I wouldn't be at all surprised if your quail hunting didn't suffer.

A suitable place for bearing and rearing young is a necessity for any wildlife species. With the steady decline of natural sites such as tree cavities, artificial nesting boxes for squirrels become even more important.

Gray Squirrel Nest Box Study

By Dr. F. S. Barkalow, Jr.
N. C. State University
Photos By The Author

USUALLY it is in the city park that most of us first meet *Sciurus carolinensis* — the "shade-tail of Carolina," as the gray squirrel's scientific name is translated. This friendly native has adjusted to the tree-lined streets and the parks of our cities and towns, for it is an ingenious opportunist, whose uninhibited talent for pilfering tidbits from "squirrel proof" bird feeders and appropriating bird houses is a source of amusement to some and annoyance to many other city dwellers. While the gray squirrel has flourished in the cities, it has not been as successful in adjusting to the changes that have been taking place in our forests and woodlands.

Because the gray squirrel is an important game species wherever it occurs, and because there is particular concern over the progressive deterioration in the quality of its habitats in forests under intensive management for maximum timber production, many conservation agencies have undertaken studies on the biology and the ecology of the species. In reports based on these studies, one finds a recurrent theme—the squirrel population appears to be low because of an inadequate number of natural dens and a lack of variety in mast-producing trees. (The term mast has been used in this country since early colonial days to mean the fruits of those trees or shrubs that furnish food to wild and domestic animals.)

Two conditions are invariably associated with high densities of gray squirrels—an abundance of natural nest cavities and a large, dependable year-round source of food. Both of these ingredients were present in bountiful supply in our woodlands more than a century go; today only a precious few, isolated remnants of virgin forest remain. One deleterious factor in our forest has been the systematic removal of such commercially valuable trees as the white oak, walnut, black cherry, hard maple, hickory, and pines, all of which are important mast producers. The cumulative effect of the selective removal of these species has been their virtual elimination as major mast producers and, consequently, a progressive reduction in the variety of food available to squirrels.

The full significance of the tragic loss of the American chestnut and the severe reduction in the chinquipin's productivity as a result of the introduction of the chestnut blight will probably never be known. Both were extremely important items in the diet of the gray squirrel.

The greater the diversity of food species in a forest the more dependable and uniform will be the overall food supply. Since all species do not flower and fruit at the same time, the effect of an unseasonable killing frost on the squirrel's food sources will not be as disastrous in forests with a large variety of mast-producing species as in those woodlands with an equal number of trees but with fewer species.

Trees with cavities provide the gray squirrel with dens for winter use, sites for the production

of the spring litter, and essential escape facilities from predators. Where there is an abundance of dens and an adequate year-round food supply, the gray squirrel is capable of maintaining high populations even in the presence of such effective natural enemies as the bobcat, raccoon, great horned owl, red-tailed hawk, and the black rat snake. No such protection is provided in those forests where hunters have cut down den trees in order to capture squirrels, and where silviculturists have systematically eliminated hollow and defective trees. These practices have resulted in a reduction of available cavities in some woodlands far below the number required to support even a moderate squirrel population.

With the recognition that the relatively low populations of gray squirrels in our forests were probably the result of an inadequate number of dens and a lack of diverse food-tree species, the question arose as to how the situation might be remedied. The food diversity problem could be alleviated by the simple expedient of permitting a few trees of each major mast-producing species to reach maturity and then retaining them for food production. Lack of den sites was a more difficult problem. Trees with cavities are usually of little value for timber and are not always good mast producers. Furthermore, a great deal of time is required for the development of an adequate number of natural dens in a woodland from which all hollow and defective trees have been removed. One possible solution to the absence of natural dens was the erection of artificial ones throughout a woodland.

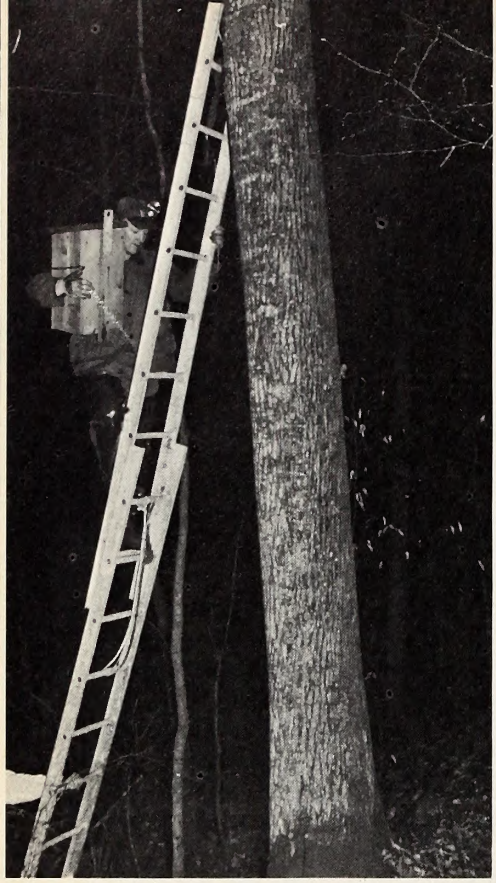
The readiness with which tree squirrels utilize artificial den boxes has been common knowledge for decades. In city squares around the turn of the century, the combination "bird and squirrel" house was as essential a feature as the central band stand. The information on the squirrels' use of boxes remained, however, more a matter of esthetic interest than practical importance until the 1930's, when a number of state conservation agencies, concerned about the decline in their squirrel populations, undertook studies on the life history and management of the gray squirrel and its larger relative, the fox squirrel.

Artificial den boxes have played an important role in many of these investigations, for the comparative ease with which squirrels could be captured in them made an effective tool for gathering life history data. In a study in 1947-50 at North Carolina State University, we found that female squirrels would produce both spring and summer litters in artificial nest boxes. Although the spring litter is habitually produced in a natural cavity, the gray squirrel's summer litter is almost invariably born in a leaf nest in the open. It came as a real surprise to find summer litters being born or moved into newly erected nest boxes during the investigation.

Despite almost three decades of gray and fox squirrel studies, one question remained unanswered—"Would artificial nest boxes increase the number of squirrels in a woodland irrespective of food availability?" So, in March, 1956, I undertook a research project under the sponsorship of the North Carolina Wildlife Resources Commission. In January, 1962, the scope of the nest box study was enlarged by a grant from the National Science Foundation to investigate population phenomena. After nine years, and with the help of seven graduate students, over 125 undergraduates, and with the benefits of field assistance and consultation from colleagues in the University's Departments of Zoology and Experimental Statistics, we believe that we have the answer—at least for our research areas. But that's getting ahead of our story.

It was not without considerable misgivings that I began the nest box study in the first place, for our previous squirrel investigations had highlighted several difficulties, not the least of which was that there was then (and still is) no fully reliable method for estimating the actual number of gray squirrels on a large area. Obviously, unless the total population can be ascertained in one

In order to determine squirrel population levels, wire mesh traps were set in a random pattern. These were covered with black vinyl plastic to provide protection to the confined animal from weather and predators.



Night checks (above) provided excellent data on nest box occupancy and family relationships of gray squirrels. Below, the development of the tail pelage and physical condition of a young gray squirrel is checked.

The smaller the box's entrance the greater protection the occupants receive. Possums, raccoons, and larger predators are excluded by a 2½" round opening which approaches the minimum size required by the squirrels themselves. Below, live-trapped squirrels are removed during spring census period.

way or another, any information on nest box use would be meaningless. Even the mobility of the squirrels could introduce unreliable statistics in any live trapping results. The nature of the problem made it imperative that the project be continued without interruption over a period of years and in relatively large experimental areas, or our efforts would be largely wasted. This, then, is a story of one way in which a population study can be carried out for conservation and management purposes.

We began with a three-step study on two experimental areas in contiguous state parks. These parks contain 5,080 acres of almost unbroken subclimax and climax woodland that have been closed to hunting and logging for nearly 30 years, and so were ideally suited for our experiment.

Natural dens were abundant; a large number of gray squirrel predators were present; human vandalism would not be a problem; the squirrel population appeared to be adequate for our needs. A continuous 2,500-acre tract along the southern half of the parks had been reserved as an isloated and undisturbed natural area when the two parks were established. It was in this inviolate woodland that we located the two experimental plots, each approximately 200 acres in extent and ¼ mile apart. For the first part of the study (1956-1960) we erected two boxes per acre on half of each of the two 200-acre plots. In the second part (1960-1962) all boxes were removed. In the third part (1962-1964) we reversed the first procedure—putting boxes on previously unboxed sections and leaving the other halves for con-

trol areas.

Approximately 400 boxes were kept in continuous operation throughout the first four years of study, and 389 were studied during the last two years. Both fall and spring live trap censuses were conducted on each pair of duplicated plots from November 1958 through December 1964.

The artificial dens for these investigations were between 10 and 25 feet from the ground and were spaced 35 yards apart along a north-south axis and 70 yards apart on the east-west axis.

After four years of experimentation, we were able to develop an efficient, light weight, live trap to meet our special needs. It had to be dependable, easy to set, able to protect the trapped squirrel from the weather and from injury by other animals, and yet be light and compact enough to permit ten of them to be carried at a time—a necessary adjunct in view of the distances we had to cover.

During the first part of the study, day-time box checks were ordinarily made four times a year. In the latter half of the 1962-1964 period both day and night checks were made—approximately 11,000 individual box examinations.

The traps were placed on each of the four 100-acre units by what is known as "a table of randon numbers," to insure that they would not be set on a geometric pattern. This gave us equal possibilities of capturing squirrels using nest boxes and those using natural nest sites on the plot.

All squirrels captured in leaf nests, nest boxes, or live traps were marked—by toe clipping, if they were unweaned young, or by serially numbered metal tags in both ears, if they were larger. Toe-clipped animals were also ear tagged when recaptured later as yearlings or adults.

The interval between the summer of 1962, when the boxes were erected, and the spring of 1963 represents a period during which the squirrel population was becoming adjusted to the increased number of nesting and escape dens on the boxed plots. If predation was a significant factor in the population, the full benefit of the greater security provided by the boxes would not be observed before the fall of 1963. This is because the boxes were not erected in time to insure maximum use by females producing 1962 summer litters. Another breeding season would have to occur before the increase in litter survival, provided by the boxes, could be assessed accurately. In addition, it was a possibility that the grid location of the boxes provided additional escape facilities for the adults—facilities that would not have been present under natural conditions.

Interestingly, yearling squirrels are much more likely to be recaptured than are the adults. During the 1963 census on boxed plots, there was a recapture rate of 29.4 percent of 599 adults, and 45.9 percent of 344 yearlings. There seem to be two primary reasons for this: the greater survival of litters born in the nest boxes, and the additional escape facilities provided by the boxes that augmented the already existing natural cavities. There was some evidence that the artificial nest boxes curbed dispersal of those young born on the area and tended to hold those individuals that entered the plot from some other site.

We also found evidence to support our hypothesis of the higher survival rate of nest box young. We analyzed the live trap recapture data of marked animals from litters caught during checks of summer leaf nests and nest boxes. By using only those young from leaf nest litters on the boxed plots and young found in nest boxes, we discovered that 17.5 percent of the 286 young from nest box litters were subsequently retrapped. Only 7.7 percent of 117 young leaf nest litters on the same plots were retaken.

The recapture rates were virtually identical for squirrels on boxed and unboxed plots during any one census period (two to four weeks), but a higher survival rate of adults on the boxed plots is suggested by the live-trap recovery records we obtained four or more months after the animals' first capture in a trap. Of 305 adults and yearlings captured on the boxed plots, 43.9 percent were retrapped after the minimum interval of four months; of 279 from the unboxed plots, only 29 percent were recaptured after this same period of time.

On analyzing our data and reviewing our field notes, it became apparent that during the years of investigation, the size of the annual mast crop had fluctuated between extremes of bountiful abundance and almost catastrophic failure. As was to be expected, the squirrel population increased immediately following periods of mast abundance, and declined during years of scarcity. In the planning stages of our project we had recognized the possibility that in years of a critical mast shortage the squirrel population might fall to a point at which an excess of natural dens would be available on both the boxed and unboxed plots.

We had assumed that when such an event occurred there would probably be no difference between the squirrel populations on the two types of sites, because food, not dens, would then be the critical factor. We were astonished when we discovered a relatively larger population on the boxed plots not only during peak years of squirrel and mast abundance, but also when there were critical food scarcities and squirrel populations were so low that there was a surplus of available natural dens on both the boxed and unboxed plots.

Thus, after nine years, we feel we *may have* found an answer to the long unanswered question, "Would artificial nest boxes increase the number of squirrels in a woodland, irrespective of food availability?" It was our conclusion that the answer was—yes.

Hunter Belongs

• continued from page 13

Sport hunters care more than anyone else about the future of their quarry because if their quarry becomes scarce or extinct, so does their sport. Not only that, but hunters (and fishermen) are conservation-minded and care about wildlife species also for unselfish reasons—you can even call it love.

I guess my own feelings are fairly typical. I like to hunt and fish, and the kill is a very small part of it. I like to watch and photograph it. I trout fish, but I probably spend as much time watching and learning the fascinating "way of a trout" as I do fishing for him. I observe the habits of quail and take pleasure from the knowledge such observation imparts.

I revel in the charm and intricacy of nature and the almost magical web of carefully related life that is spun for me each time I go out in the fields or woods or on the water. I like the smell of fresh crushed pine in the thickets and the feel of crisp air on my face, or the surge of clear, clean water against my waders. My moods are atune to the ebb and flow of nature, and like all hunters and fishermen, I would be out there in the middle of this marvelous mystery even if I had never seen a gun or held a rod.

But I like to hunt and to fish, and I enjoy the thrill of a clean kill or the considerable accomplishment of fooling some wary old brown trout. I also like to eat the game and fish I kill. So I hunt, and I do so with the full knowledge that what I and my fellow sportsmen, kill or catch will not be missed in the natural scheme of things. I also know that my predation is as natural and useful as—for instance—a hawk's.

The reason I know that my modest kill will not alter future populations is because sport hunters, like myself, have been careful to make sure of that fact. To make certain that we do not commit the crimes of market hunters, we pay our money directly in the form of licenses and other fees to support state and federal game and fish agencies. These agencies, like the North Carolina Wildlife Resources Commission, employ biologists, enforcement officers and others to determine what we can take and how many. Through research, "safe" seasons and bag limits are established that allow sportsmen to stay well within the natural limits without hurting future populations. Not only are seasons and bag limits set each year to conform to current situations and local conditions, the sportsman also sees a significant part of his license dollar spent in vast management programs to improve the habitat for game and fish (and, incidentally, all other forms of wildlife). Actually, research, management, protection, and public education programs have had astounding results. In many instances, populations of hunted (and fished) species are higher today than at any time in history, even before Columbus opened the new world to the questionable "conveniences" of neon signs, parking lots, and six-lane highways and other forms of "progress."

These programs have cost the sportsman a lot of money, but it is money well spent. It buys insurance to see that all forms of wildlife will have a good future. In fact, the hunters and fishermen are the only ones now putting up any considerable sums of money to buy this insurance.

What makes it all so ironically sad is the fact that many non-hunters and non-fishermen who obviously are concerned about the future of wildlife species have not realized that the sportsmen is really on their side.

If this subject intrigues you, I would suggest that you read Aldo Leopold's well-known textbook on the subject titled "Game Management."

I know this is long, but I hope it helps explain what I'm afraid far too few people understand.

Best wishes,

Jim Dean,
Wildlife Education Representative

Ecologically speaking, there are two kinds of people in this world—those who are already environmentalists, and those who will be.

In one sense, an environmentalist is a man or woman who has experienced a tragedy or loss. A man becomes an environmentalist when some bureaucracy builds a road through his carefully nurtured farm, or when an agency floods the family homestead. He becomes an environmentalist when the nearby river is converted into an ugly, shallow and lifeless ditch, or when he no longer can eat certain seafoods because they are filled with man's poisons.

Man becomes an environmentalist for many reasons, some of them of much smaller magnitude. The loss of the old family swimming hole to pollution can do it. So can the loss of a favorite hunting or fishing area.

But in each case, today's environmentalists were spurred to action either by some tragic loss or the threat of one.

"I never thought much about the environment," a wealthy businessman told me recently. "I thought the whole thing was a bunch of hogwash from sentimentalists who didn't know what they were talking about.

"But I began to see their point of view one day last summer, and it has caused me to change my thinking," he admitted. "In recent years, my son and I have taken an annual camping trip to the mountains to do some trout fishing, and we always looked forward to it. This past year, we couldn't go to our favorite stream because road building and timber cutting in the area had turned the stream into pure mud. We had to go somewhere else, and I've recently heard that similar work is being planned in this area. I don't know where we'll go next."

Here is a classic case of a man to whom the environment meant nothing until it touched him personally. Now, he is concerned, and he has begun to re-evaluate his whole thinking because of it.

The people in this country who are still not concerned about the environment are those who have not yet come face to face with it. They have been lucky so far, but it will not last. Sooner or later, each of us will be involved whether we want to or not.

The big myth that has perpetuated anti-environmental forces is that certain losses are necessary in order to achieve growth and progress. It is not even a half-truth. Many of the massively destructive projects being pushed upon us are not necessary. Almost invariably, there are alternative ways of approaching the problem that are less expensive and less crippling to the environment and quality of life. The main profit in huge environmentally destructive projects goes to the agency or bureau which constructs them. These organizations need such projects to justify their budgets, even their very existence, and far too little attention is given to the price the public is paying in tax dollars and loss of natural resources.

As more and more of us are touched by environmental losses and become aware of the terrible price we are paying, we will change our attitudes just as the businessman did. It is sadly inevitable that someday soon, all of us will be environmentalists. The present course of human endeavor leaves us no choice.

Jim Dean

Foxes

Dear Sir:

Over the past week I have become confused about foxes and their constructive or destructive role in the game bird (quail, grouse, etc.) population.

I have been a bird hunter for many years and have been led to believe, by my dad and uncle, that foxes are destructive to game birds. However, on a recent grouse hunt in Madison County, the owner of the land on which we had been granted permission to hunt, asked us not to shoot his foxes. After agreeing we asked him why. He told us that he was a fox hunter and that foxes were helpful to the bird hunter. He also said that wherever there were foxes there was also a good healthy population of game birds, because foxes captured injured or diseased birds which could destroy a whole covey; however, he said nothing about young birds which weren't capable of flying.

After hearing this, I wasn't too excited about hunting there, but the trip turned out enjoyable producing several grouse as well as spotting a gray fox.

Please let me know what you can do to help me solve this confusion, as well as anything I can do to improve the game bird population in North Carolina.

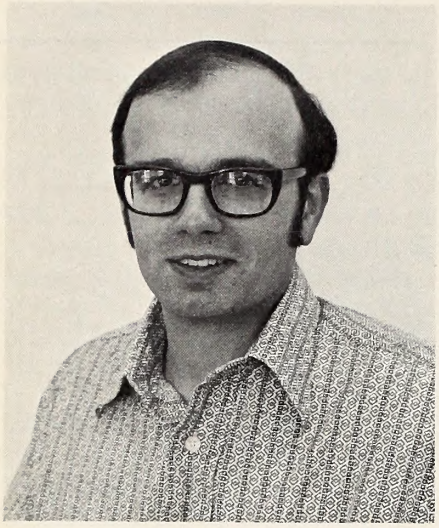
Joe Bingham,
Mars Hill

- Although foxes will take game birds when the opportunity arises, the bulk of their diet is mice, rats, and rabbits. Seldom is a scarcity of quail directly traceable to a high fox population. Generally, foxes do more good than harm. Ed.

Motorcycles

Dear Sir:

In the August 1972 issue a



Game Division Assistant Chief For Services Named

A. Sidney Baynes, 26, has been named to replace Ted R. Mitchell who died suddenly in late November. He had been with the Wildlife Commission for 25 years. Baynes, who joined the Commission two and a half years ago, was previously a District Game Biologist stationed in Lumberton. He assumed his new duties December 1.

Baynes will coordinate many of the functions of the Commission's nine district biologists, and will be in charge of the Upland Game Restoration Program which includes managing the distribution of wildlife food and cover plantings and technical assistance to farmers.

In recent months, Baynes has been assisting in a project to establish a permanent population of ring-necked pheasants in northeastern North Carolina by trapping and restocking from a wild population on the Pea Island National Wildlife Refuge. He has also been involved in mercury studies along the Cape Fear River and deer studies at the Sandhills Game Land and Fort Bragg.

Baynes, a native of Shelby, graduated from Wendell High School in 1964, and has B.S. degrees in Forest Management and Wildlife Biology, as well as an M.S. in Wildlife Biology, from N. C. State University.

At the 1970 N. C. Wildlife Federation meeting in Winston-Salem, the Guilford County Wildlife Club presented Baynes with a $200 scholarship for his wildlife studies.

"I greatly appreciate this opportunity, and I think that the fine working relationship with Wildlife Commission personnel made it possible," said Baynes. "The people I've worked with have helped me a great deal. I realize the magnitude of the job and hope to do my best to fulfill the responsibilities that were carried on so long and so well by the late Ted Mitchell."

Baynes is married to the former Ann Knott of Wendell, and the couple has a son.

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concerned doctor from Chapel Hill wrote to *Wildlife in N. C.* expressing his views on motorcycles destroying the natural environment of our woods and streams.

I am sorry that this doctor is on the con side of trail riding for I am on the pro side of the same issue.

I like to think of myself as an outdoorsman and a sportsman, yet I do ride a motorcycle in the woods.

I am in agreement that motorcycles do some damage to the soil of some steep trails, yet I have killed deer within a few feet of such trails during open gun season.

I have also seen deer, squirrels, rabbits, birds and other wildlife during the off-season while motorcycling on trails with friends (including one doctor).

As far as fishing is concerned I am sure that a trout doesn't know if a motorcycle is in or out of the water.

In this age of growth on earth there is still room for all outdoorsmen, even though there are people of different beliefs. Each one doing something to destroy the environment. Whether the destruction be large or small, it leaves a mark that hurts.

I feel sure that all the people of North Carolina that take part in this great land could do a little better to share and make this country to shine with the same beauty and freedom it has always known.

Monte S. Smith
Lenoir

Bird Lady

Dear Sir:

As an interested reader of Wildlife, I find in your September issue a letter signed Helen Ochs, The Bird Lady. She ends with a statement: "One cannot have cats and birds at the same time."

Well, I must be more fortunate, or my circumstances here are different for the cats and birds, because for years I have had both. I happen to love all animals, but presently have several pet cats. In the morning after feeding them, I let them outdoors. There are tall trees around my property, mostly stately pines and the birds remain up in the branches. Early morning I hear them singing. As soon as my pet cats go outside, I heard loud warnings from the bluejays and a quiet comes. These wild birds are very discreet.

I have a flat-shaped bird feeder in front of my house and a bird bath, but the birds stay far up in our branches. One cat may be foolish enough to think it may eat a bird by lying on the bird feeder in the sun!

At 5 p.m. each day, we call in the pet cats for supper and they are put in our utility room for the night. I have never seen them make a meal of anything outside except occasionally a lizard. It may be that they catch snakes, because none are around my yard while my neighbor nearly stepped on a copperhead when she stepped out of her car recently. Another neighbor has had an exterminator come because there were a family of mice in her attic. Of course, he had no pet cat to scare them away.

As soon as my cats are indoors, the birds outside seem to know. Usually a squirrel descends from the trees first and eats the sunflower seed from the bird feeder. Then comes the bluejays, the woodpeckers. The next order of descent are cardinals and they won't let their rather drab wives eat until they have finished. I have found great order in nature.

Elizabeth Patterson
Myrtle Beach, S. C.

New officers elected by the Wildlife Resources Commission at its January meeting are D. Jack Hooks, Chairman (center); W. K. Anderson, Vice Chairman (right); and Jay Waggoner, Secretary.

Fan Mail

Dear Sir:

While holding my breath and crouched under the sheet of paper with Mr. Rushing climbing down the rope ladder to get out of the path of the wild hogs the telephone bell brought me back to the realization I was sitting in my living room instead of being on the Wild Boar hunt (Soft Walking for Hog Stalking —Nov. 1972). Never have I enjoyed articles more than I have the ones by Jerry Rushing. He takes you right along with him. In fact, you really have a front seat the way he describes his adventures. Even if I didn't like sports, especially hunting and fishing, I would like his articles.

My husband, also an avid sportsman, nor I have ever met Mr. Rushing. We sincerely hope you will continue printing his adventures.

Yours truly,
(Mrs.) Blanche G. Elmore
Rockingham

Our Cover Artist

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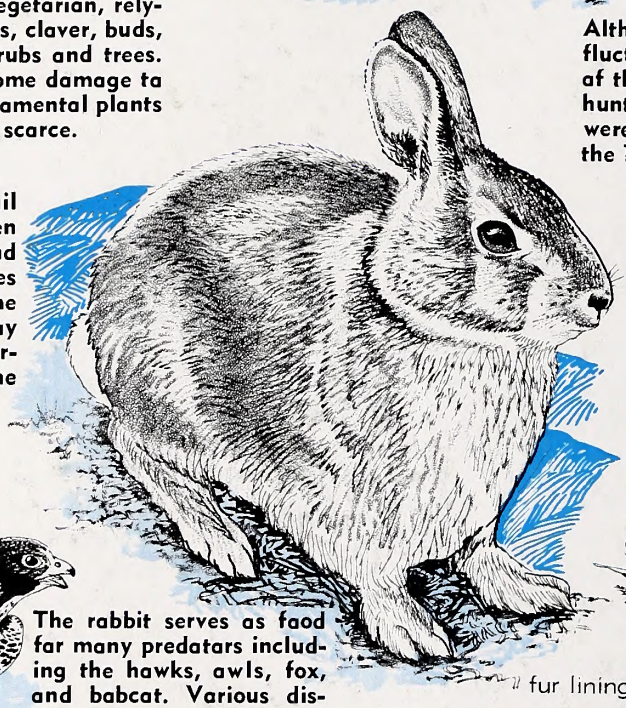
COTTONTAIL

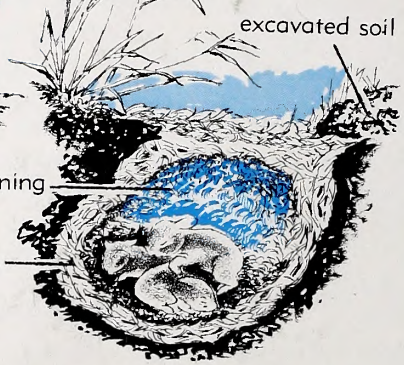
The cattantail is a vegetarian, relying an variaus grasses, claver, buds, and even bark af shrubs and trees. The rabbit may da some damage ta garden craps and arnamental plants when ather faods are scarce.

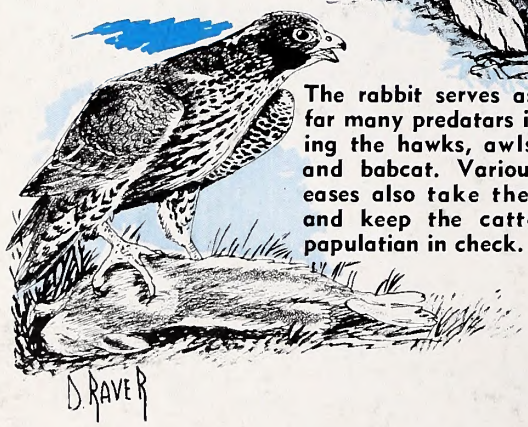
Althaugh rabbit papulatians aften fluctuate cansiderably, the harvest af this papular game animal by the hunter is usually gaad. Over 1,700,000 were taken in Narth Carolina during the 1970-71 hunting seasan.

Mast adult cattontail rabbits weigh between 2 and 3 pounds, and are less than 20 inches lang. The calar af the thick furry caat is gray or brawn. The pawder-puff tail is white an the underside.



The yaung are barn in a nest dug by the female. The cavity is abaut 4 inches deep, and 5 by 7 inches in extent. It is lined with fur and grass and is well cancealed by a covering af grasses fram the area.





The rabbit serves as faod far many predatars including the hawks, awls, fox, and babcat. Various diseases also take their tall and keep the cattontail papulatian in check.

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25 CENTS / MARCH 1973

PHOTO BY W. MARVIN WILLIAMS

Early Worm Gets Bird

This male starling bit off a little more than he could chew. This unusual event was discovered in the yard of Dr. F. S. Barkalow, Jr., last fall. Dr. Barkalow examined the bird and found that the windpipe had been completely closed by the mass of the "worm", which was identified as a June beetle larva.

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

* * *

WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 101,730.

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 3 MARCH, 1973

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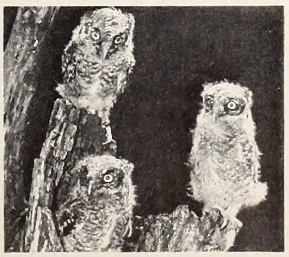
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



"Baby Screech Owls" is its title, and it won first place in the color division of the current Wildlife Photography contest. Tally O. Bowman took it, and a couple more of Mr. Bowman's fine shots are found with the rest of the contest results starting on page 14. A Topcon Super D with Kodachrome II film did the trick.

Success or Failure?

The New Expanded Game Lands Program

By Frank B. Barick
Chief, Division of Game

TWO years ago—during the 1971-72 hunting season—the Wildlife Commission initiated a new expanded game lands program. After two years of operation it is time to review that program to evaluate its accomplishments. Some questions that need to be answered are: Has it provided a framework for expansion of game populations? Has it provided more hunting opportunity? Did the loosening of restrictions governing hunting on game lands go too far or should they be further loosened? How can the program be further strengthened and improved?

During the past two years we have received many reports from hunters in all parts of the state about the program. Most have been highly favorable but some have expressed concern and point to a need for modification. Starting with the premise that the program is basically sound, we shall devote this article to those weaknesses in the program reported to us by Tarheel hunters and we shall discuss various alternatives for improvement. Hunters are invited to study these ideas and to let us have the benefit of their thinking so that we can develop a series of specific proposals for changes to be aired in the course of the public hearings on game regulations.

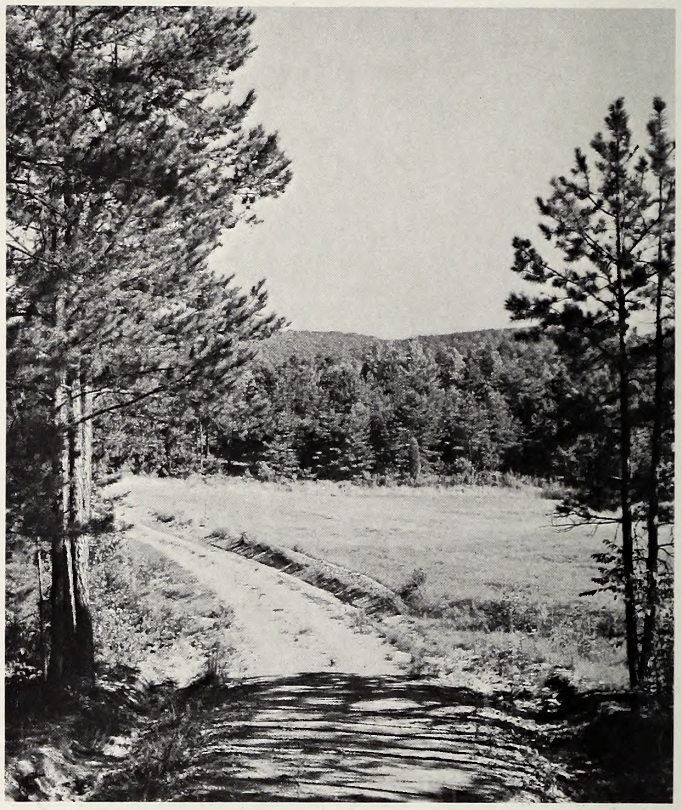


PHOTO BY JACK DERMID

Many suggestions pertaining to the new Game Lands program have been offered. The Uwharrie (above) received its share.

Western Game Lands

Reports received from some hunters indicate that they feel there has been an excessive loosening of hunting restrictions on game lands in the far western part of the state. If we interpret these reports correctly, the greatest concern is about survival of big game in the Santeetlah section of game lands in Graham County and somewhat lesser concern about the Fires Creek section, with the problem becoming progressively less acute eastward. Some sportsmen have suggested that complete closure of the Santeetlah Bear Sanctuary to all hunting for a year or two will be necessary in order to preserve big game populations there.

Several western Tarheel hunters have reported that there is a need for more intensive wildlife protector surveillance of game lands, particularly those parts constituting the former wildlife management areas. Along with this have come requests for more control of stray dogs. Some feel that wildlife protectors should be stationed on these areas as was done under the former program. Others have asked that all hounding type hunting should be terminated on the western bear sanctuaries. Some have suggested, by way of compromise, that raccoon hunting on bear sanctuaries should be limited to Friday nights and that no wildcat hunting be allowed.

In some sections of the far west, hunters report finding dead doe deer, presumably shot and left. Others point out that this is a normal result of buck hunting and that similar observations were made under the old system. The poor mast crop throughout most of the west coupled with rainy, foggy weather at the opening of the season apparently resulted in poor deer hunting success in a few sections. In spite of this we have also received reports of many deer being seen and many fine trophy animals being taken. We received many reports that

this was a banner year for deer hunters in most of western North Carolina.

Most hunters apparently recognize that there has been a substantial increase in habitat improvement through plantings and other practices and we have not had complaints in this direction. Most also realize that there has been a substantial increase in number of wildlife protectors but they feel that there should be some changes in the way they patrol the game lands. Many hunters have asked for a tightening of regulations governing hunting on western game lands. Many also feel that there should be an increase in the size of fines for game

PHOTO BY JOEL ARRINGTON

More protection and more stringent regulations were voiced for future consideration on Game Lands such as the Sandhills.

law violations. But most people apparently do not want to go back to the old check-in check-out system of hunts.

Another area of general concern in the west is the loss of either sex deer hunting opportunity for archers. Under the old program there were two weeks of such hunting on the wildlife management areas. Due to a strong undercurrent of opposition to expansion of this privilege to the expanded game lands acreage, it was omitted from the new program. Many feel that it should be reinstated, at least in some sections, and that such a season should be scheduled before the squirrel and grouse season. Reasons given for this were: 1) to prevent illegal gun kills of deer during the archery season and 2) hunter safety.

By way of solution, several alternatives might be considered. Since most of the old wildlife management areas have been designated and posted as bear sanctuaries they provide a means of establishing tighter restrictions in key locations. This would probably be much more practical than attempting to apply tighter restrictions on the entire million acres of National Forest game lands. Restriction of coon hunting to Friday nights on the bear sanctuaries would not represent a severe curtailment of coon hunting opportunity since the bear sanctuaries occupy only a small portion of total game land acreage. The same might be said about closing bear sanctuaries to fox and wildcat hunting or dog training. And it might also be appropriate to bar all firearms on these areas other than designated open seasons.

Stationing wildlife protectors on game lands would be more difficult for a number of reasons. Most residences formerly occupied were constructed many years ago and are substantially substandard by modern building codes. For this reason some have been disposed of. It might be more practical to assign certain units of game lands for more intensive surveillance. Our protection force is designed for a high level of mobility which lends itself to special detail work. Actually, the number of prosecutions made by protectors under the new program has substantially increased. It is likely that if there were more stringent regulations applicable to key areas, such as bear sanctuaries, intensified surveillance thereon would accomplish the desired results. The practicality of this approach is enhanced by the fact that several of our former wildlife area managers who were transferred to the Protection Division as full time enforcement officers are stationed very close to the major blocks of game lands.

Establishment of heavier penalties for game law violations is beyond the authority of the Commission. First, such increase in penalties would have to be enacted by the Legislature; second, their application would be up to the courts. These actions could only result from strong demand by the sportsmen themselves—the first by contacting their local senators and representatives, the second by contacting their local authorities.

Central Game Lands

Complaints about game lands in the central part of the state appear to involve three areas—the Butner, Uwharrie and Sandhills game lands. At Butner the major complaint is in regard to excessive hunting pressure. This problem is apparently not confined to the game land but exists throughout the major deer concentration area in parts of Granville, Person and Durham counties. Some have suggested that hunting be controlled by special permit on the game land but this would make the problem still worse on adjoining private land. Another approach which might be worthy of consideration would be to open the deer season in the Butner section at the same time as the rest of the dog deer hunting season in eastern North Carolina. This

would have the added benefit of reducing hunting pressure on the Sandhills Game Land.

Another complaint about the Butner Game Land is that much of it cannot be hunted because it is designated as safety zone. It has been suggested that the safety zone which contains the hospital grounds and a substantial buffer strip, be open to either sex deer hunting for archers. This is a relatively safe form of hunting and would help to keep the deer population under control. Such a change, however, could not be made without the approval of the Hospital authorities.

Concern about the Sandhills Game Land as reported to us centers about reduction of hunting pressure and opening more of it to hunting. Opening the Butner deer season at the same time as that on the Sandhills would tend to reduce hunting pressure on both areas. Under the present schedule many hunters start the season on the Sandhills, then shift to the Butner area when that season opens a few weeks later.

Closure of the field trial area to hunting after November 1 to prevent conflict with bird dog field trials has been another source of complaint. Since this is the only state-supported bird dog field trial area in the state it is worthy of preservation as such. Perhaps some relief could be derived by reducing the buffer zone around the area allocated to field trialing. Another suggestion we have received would be to allow archery still-hunting for deer on the field trial area itself. It is argued that archery hunters are relatively inconspicuous, they do not hunt with dogs, and would probably provide no impediment to the field trials.

Complaints have also been received about excessive deer hunting pressure on the Uwharrie Game Land. Most of this pressure is centered about the former Uwharrie Wildlife Management Area. It appears that most hunters do not realize that the Uwharrie herd has spread into other units of National Forest Land surrounding the old wildlife management area. Our field people report that there are very substantial deer populations in the Morris Mountain section to the east and the Burkhead Mountain area to the north, as well as the Cheek Creek section and many of the smaller blocks of game land shown in the game land map book. Dispersal of hunters into these sections would substantially reduce hunting pressure and provide quality hunting in these outlying areas.

Where to hunt? With all its problems and needed modifications, the Game Lands program still is a good answer to this question.

PHOTO BY JACK DERMID

Eastern Game Lands

Sportsman complaints about eastern game lands are limited to two items. The first of these has to do with Holly Shelter. Many complaints have been received from all parts of the state about the reduction in hunting opportunity imposed by the Legislature. The Legislature is of course the ultimate authority in North Carolina and the Wildlife Commission must, by law, conform to acts passed by that body. We have been told that those who pressed for the present law might be agreeable to a reduction in its limitations provided that some restriction in amount of public hunting be retained. We are open to suggestion about this matter.

Another item of complaint is about reports of bear kills in sections of the east closed to bear hunting. (One was also received from the western part of the state.) We have not been able to secure confirmation of these reports but it would appear that more intensive surveillance and sportsman-protector cooperation are indicated. Reports received substantially after the violation has been committed are seldom productive of corrective action. To be effective, cooperating sportsmen should report information about game law violations promptly. This can be done, cost-free, by dialing the nearest wildlife protector base station listed in the back of the hunting regulation pamphlet.

Sportsmen Comments Invited

In conclusion, it appears to us that the new expanded game lands program is a vast improvement over the old system which provided a relatively small number of highly restrictive and exclusive hunts on a few areas. This appears to be the general consensus of most sportsmen. It does provide a framework for very substantial expansion of game populations and hunting opportunity. On the other hand, it appears that some tightening of restrictions may be in order, particularly in the far western part of the state.

Sportsmen who have specific suggestions for improvement of the game lands program are urged to let us have their ideas prior to the public hearings on game regulations so that we might incorporate them into our proposals at the hearings. Suggestions should be submitted prior to April 1 since it may be necessary to have the hearings a month earlier than in previous years due to need for more time in getting the regulations printed. ◆

This is the sixth in a series of biographies of wildlife species with "Carolina" in their common or scientific names.

The White Breasted Nuthatch

by Michael A. Godfrey
Hillsborough

PHOTO BY MICHAEL GODFREY

WATCHING a nuthatch forage over the shaggy armor of a big oak you may conclude that somehow in the great scheme of creation this bird was exempted from the force of gravity. For the nuthatch there is no up, no down, no sideways. There is only the direction of the bird's travel, and that is the direction in which its head always points. The American naturalist Herbert Brandt saw the nuthatch run "fearlessly about any bark surface assuming every conceivable position, all with the nimbleness and apparent disregard of a fly." I have seen the white breasted nuthatch, **Sitta carolinensis**, drop a morsel of suet and run headfirst down the tree trunk fast enough to catch it.

Unlike the woodpeckers and creepers, the nuthatches do not use their tail feathers as props. Beyond this, no one is certain exactly how nuthatches achieve their strange brand of locomotion. Some authorities say they keep one foot permanently ahead of the other and "hitch" over the bark. Others claim the bird crawls much as a mouse. In any event the leg movements are too quick to see, so perhaps one of our readers who owns a high-speed movie camera can unlock the secrets of the nuthatch's footwork.

The name "nuthatch" stems from the English term **nuthack** and the French **notehache** which describe the bird's habit of wedging nuts into crevasses and hacking them open. We must give the Europeans credit for being close observers because this trait is not seen by the casual bird watcher. The much more obvious ability of running headlong down a tree trunk led early Americans to call the bird "tree mouse." Equally picturesque and far more descriptive, "tree mouse" also hints at the bird's "pack rat" habit of storing food for lean times.

There are 30 nuthatch species distributed across North America, Europe, Asia and Africa. Four reside in North America including our namesake **Sitta carolinensis** which loses none of its agility by being, at 5 to 6 inches, the world's largest nuthatch. **Carolinensis** is recognized by the white face below its black cap and cape, the bluish back, the short squared tail, and the white breast which gives the bird its common name. Our bird does not migrate but maintains, like the Carolina Chickadee, a low profile in summer so that its boldness in the cold months makes us think of it as a winter bird. The call is a series of nasal squeaks and toots in which I can not help but hear a mischievous laugh.

Aside from acorns and other nuts, the nuthatch's diet is mostly bark-dwelling insects and their eggs and larvae. Nuthatches are energetic controllers of forest insects, but when the natural food retreats beneath the bark in winter, sunflower seeds and beef suet are welcome substitutes.

Like many other creatures in whose names science and tradition have placed "Carolina," the white breasted nuthatch occupies a range far beyond our state. This Carolinian carries our good name to all parts of the nation except the treeless prairies. ⬍⬍

Watch For Spring

by R. Reader and H. Lieth
Botany Department, University of North Carolina
Chapel Hill

IN the introduction to our last article (*Wildlife*, Sept/72) we mentioned that the success of the N. C. Phenology Project has been instrumental in triggering a renewed national interest in phenological research. In this issue we briefly describe some other phenological networks whose activities complement our present work in North Carolina. Other approaches emphasized by these networks may be helpful in selecting future phenological projects for North Carolina. One project of special interest would be the development of a phenological calendar for North Carolina.

Predicted N. C. Spring

During the past three years we have charted the arrival of both spring and fall in North Carolina. Spring's arrival (leaf emergence in native trees) can now be predicted from an equation relating the averaged first-flowering dates of dogwood and redbud with the altitude and latitude of North Carolina locations (Map 1). A consistent relationship exists between red maple flowering date and subsequent redbud and dogwood flowering. This permits us to predict the arrival of spring using the equation given in the legend for Map 2. Now we want to elaborate other equations which relate the phenological events you report to us to certain location-dependent climatic controls such as temperature and solar radiation. For this task we require more flowering date information.

We intend to repeat our spring and fall surveys this year to collect this data, and also to see how closely the arrival of spring and fall coincide with the dates forecast by the predictive equations presented in the legends of Maps 1 and 2. If you would like to help us validate our equations by reporting flowering dates this spring, simply send your name and address to the N. C. PHENOLOGY PROJECT, c/o Dept. of Botany, University of North Carolina, Chapel Hill, N. C., 27514. We will mail you the forms and instructions necessary to make the required observations.

Spring 1971 in Eastern North America

The arrival of spring is recorded in most parts of North America by phenological networks. We usually receive dogwood, redbud, and red maple flowering date reports from a number of states and provinces. Regional phenological networks in the northeastern and central states (Hopp et al. 1972) and in the west (Caprio 1966) record the date of first and full-flowering of planted lilacs (*Syringa persica*). The N. C. Phenology Project and the lilac studies are complementary since climatic conditions are unfavorable for lilac flowering in most of the southeast.

A map showing the pattern of spring's arrival in eastern North America has been prepared by plotting lilac and averaged dogwood-redbud flowering dates for 1971 on the same map (Map 3). A comparison of 4 overlapping lilac and dogwood-redbud reports suggested that lilac flowering followed dogwood-redbud flowering by 3-5 days in 1970. The 1971 lilac flowering dates, reported from a wider geographic area, occurred 10-20 days later than the dogwood-redbud flowering dates predicted for the same locations. If we are to use the date of lilac flowering as an indicator of native tree emergence in areas where dogwood and redbud do not grow naturally, we must establish the true relationship between the two species' flowering dates in the near future.

Applications of Phenological Knowledge

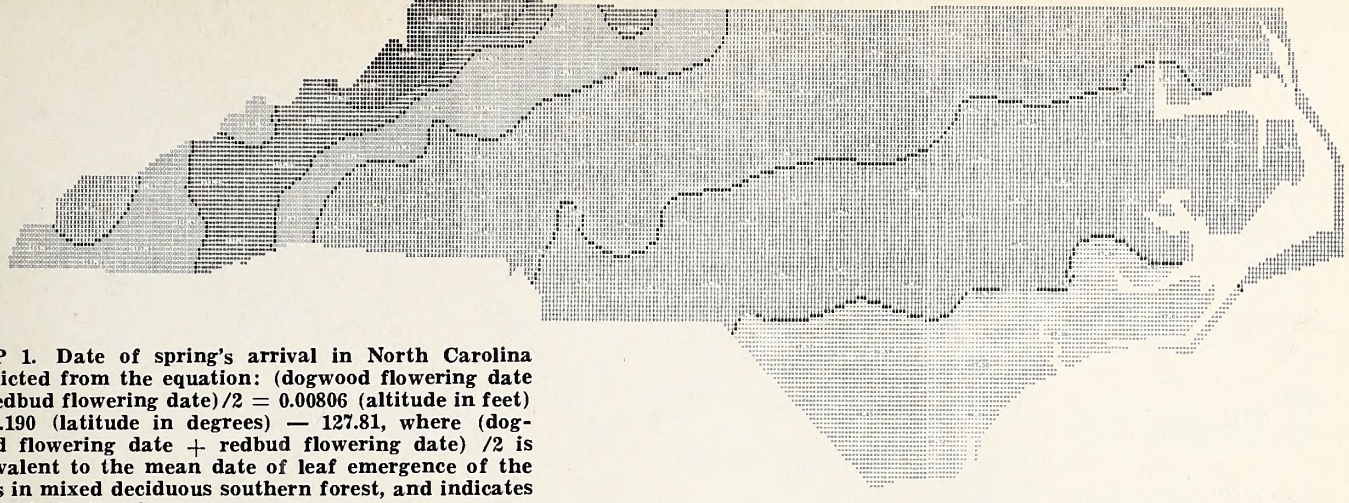
Lilac flowering dates are being recorded for two purposes. Lilacs may be considered to be highly sensitive meteorological instruments that integrate the composite effect of weather factors such as temperature, rainfall, and sunshine in their growth and rate of development. Using lilac plants that are genetically alike and observing their responses at numerous locations creates a network that supplements the cooperative weather station network of the National Weather Service.

Secondly, observation of the date of lilac flowering can be used to forecast the occurrence of succeeding phenological events on the same or other plants. In Montana, for example, some farmers make their first cutting of alfalfa hay within ten days after the lilac begins to bloom, thus harvesting it before the overwintering alfalfa weevil eggs begin to hatch. This example illustrates the most important application of phenological knowledge, which is in agricultural and horticultural management, allowing the planting, harvesting, and other control measures to be properly scheduled.

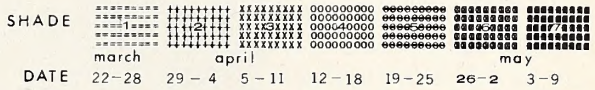
N. C. Phenological Calendar

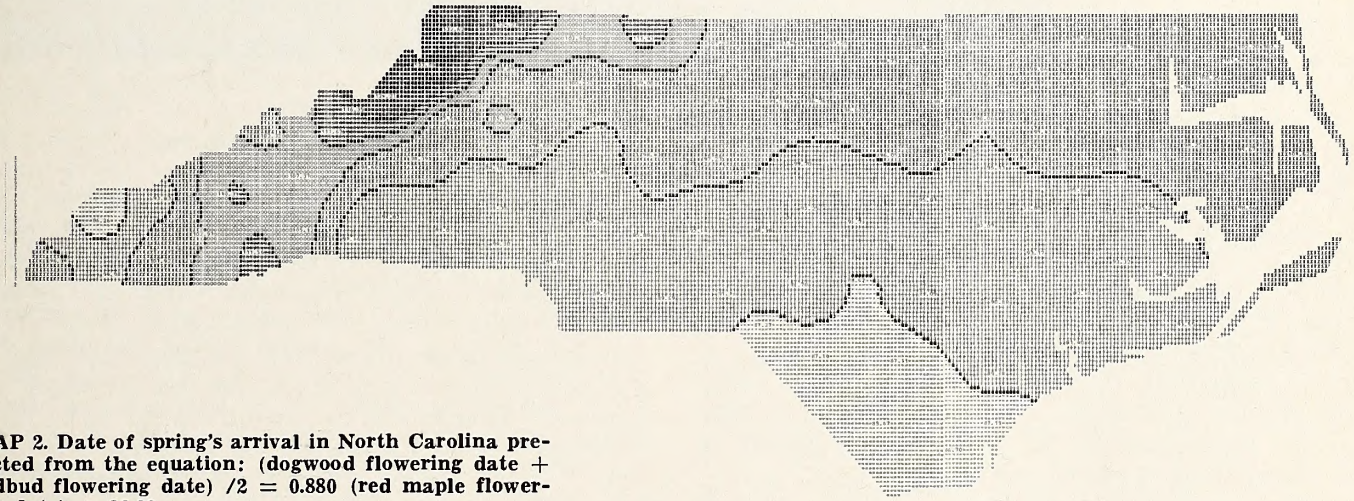
The time of lilac full-flowering in Wisconsin coincides with the hatching of the insects that cause scurfy scale disease. This relationship is only one of a number of phenological relationships listed by Conrad (1972) in his phenological calendar of pest insects. In this calendar he notes that the time of dogwood flowering in Wisconsin coincides with the time of oyster shell scale insect hatching. It would be interesting to know if the same relationship exists in North Carolina. The N. C. Phenology Project might become the vehicle by which a phenological calendar of economically important events could be prepared for North Carolina. Some pairs of phenological events are probably already in use by individuals in North Carolina.

We would like to accumulate a list of phenological relationships which North Carolinians have found useful. We invite you to send your observa-



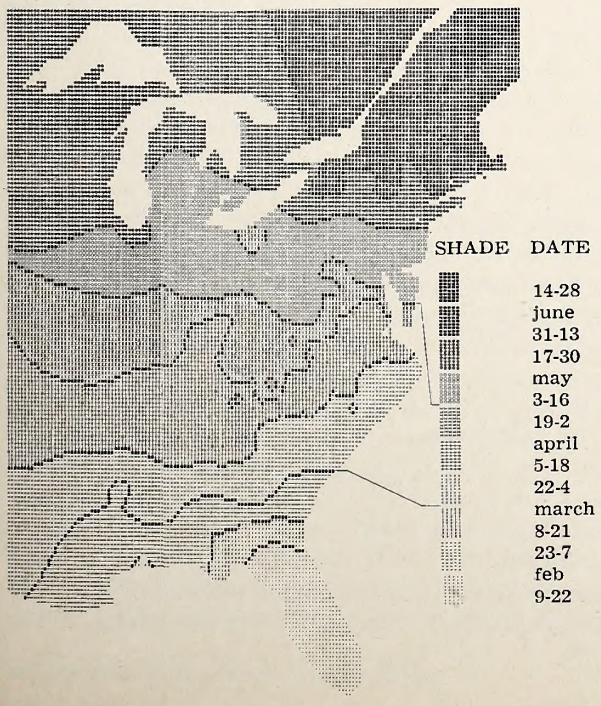
MAP 1. Date of spring's arrival in North Carolina predicted from the equation: (dogwood flowering date + redbud flowering date)/2 = 0.00806 (altitude in feet) + 6.190 (latitude in degrees) — 127.81, where (dogwood flowering date + redbud flowering date) /2 is equivalent to the mean date of leaf emergence of the trees in mixed deciduous southern forest, and indicates the arrival of spring.





MAP 2. Date of spring's arrival in North Carolina predicted from the equation: (dogwood flowering date + redbud flowering date) /2 = 0.880 (red maple flowering date) + 38.90.

MAP 3. (below) Date of spring's arrival in eastern North America. Lilac 1971 flowering dates reported by Hopp et al. (1972) have been plotted along with the averaged dogwood-redbud flowering date reported to us by our observer network in 1971.



tions and predictive methods to us at the address given earlier in this article. We will compile a list and phenological calendar of events in North Carolina and share it with all our readers in a subsequent issue of this magazine. Such relationships may be of wide interest to people scheduling activities not only in agriculture, but in gardening, fishing, and hunting as well.

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Frogs and Toads

By Rod Amundson

BULLFROG

PHOTO BY REX SCHMIDT

SONGBIRDS do not have a monopoly on announcing the arrival of spring. Out in the woodlands, in the still, dark forest pools, out in the meadows and marshes, millions of frogs set up a vernal symphony which echoes to the hills a prelude to spring. From late March to early July, it is almost impossible, on a warm evening, to get away from the sound of frogs. The sound may vary from the "E" above middle "C" of the spring peeper to the bass grumping of the bullfrog.

There may be some question in the reader's mind as to why frogs should be thought of as an important wildlife species. Although frogs are classed as neither fish nor game, they provide a great deal of sport, delicious food for the dinner table, and because of the effect they have on insect control, are of vital importance to agriculture

Frogs, toads, and their close relatives, salamanders, make up a group of animals which lie between fish and reptiles in the biological classification of the animal kingdom. Their life history lends significant support to the theory that all life sprang from one-celled organisms, and that all terrestial animals are descended from those which lived in water. Grouped together, frogs, toads and salamanders are called amphibians. Frogs and toads are very closely related; salamanders, however, differ in appearance and in life history. Mature frogs and toads are always without tails, while salamanders (mud puppies, spring lizards, hellbenders) retain long tails throughout life.

While everyone is familiar with frogs and toads from childhood, few people have the interest and take the time to find out how really fascinating these creatures are. Literature is full of stories and references regarding frogs and toads. Toads especially have been surrounded with half-truths and legends. Many people, even today, believe that toads can shoot blood from their eyes, that warts result from handling them, and that their breath is poisonous. Toads with "blood in their eye" probably get that way in circumstances of extreme excitement when a blood vessel bursts and blood diffuses through the external tissues of the eye. There is no foundation whatever to the tale that toads cause warts. The wart-like lumps on toads are thickened places on the skin containing considerable pigment and glands which secret a repelling liquid. This liquid is strongly acid, and will repel most predators. It is not poisonous in the usual sense of the word, but a young dog which has mouthed a toad will never again molest a toad. He may lose his appetite for a day or so, and drool profusely, but he has not been poisoned. Skunks are known to eat toads, but will not do so until they have rubbed the victim on the ground until the secretion from the warts has been removed. Frogs may secrete a similar substance from folds in their skins, but not to the degree that toads do.

Many people are perfectly sincere in the belief that it rains frogs and toads. They come to this conclusion after driving down a paved highway in a heavy rainstorm and seeing thousands of frogs and toads hopping about. Actually the frogs and toads are taking advantage of the heavy rain to move across the road in a migration to or from their breeding pond, or to catch insects knocked out of the air by raindrops.

Life History

The calling, chirping, or croaking of frogs is closely associated with mating. It is during the mating season that most of the singing occurs. Frogs have vocal chords, and thus are the lowest order

of animals to have true voices. The amazing thing is, most of the sounds made by frogs are accomplished with the mouth closed. Only when in extreme peril do certain frogs cry out with open mouths. In normal singing air is b r e a t h e d in through the nostrils, and forced into sacs under the skin which can be inflated to amazing proportions. Then by muscular contortion, the air is forced over the vocal chords so that audible vibration is set up. The inflated voice pouches act as sounding boards and greatly increase the volume of sound. Thus a tiny tree frog less than an inch long can raise echoes from a hillside hundreds of yards away.

Some frogs fill the voice sac with air and then expel it forcefully in a long-drawn "skreeeee . . ." that leaves a wrinkled and deflated fold of skin.

Toads give voice in the same manner as frogs. The sounds may range from dull grunting noises to long wails or soft bird-like chirps. Persons who have made a study of frogs and toads can readily identify them by their voices just as songbirds may be named by their singing.

Although bodily contact occurs during mating, this contact does not resemble copulation in higher forms of animals. The male clings to the female and fertilizes the eggs as they emerge from her body. The eggs, varying in size and number among species (although not always in direct ratio to the size of the frog) are laid in a mass of gelatinous material secreted from the body of the female. Where frog-eggs are deposited in shapeless masses, the eggs of toads emerge in long gelatinous strings. Depending on circumstances and species, the eggs may float freely near the surface of the water or be attached to submerged vegetation.

All frogs and toads, however terrestial they may become, must spend two phases of their life in water, first when they are deposited as eggs and hatched into tadpoles, and later when they return to mate. Toad eggs may hatch in three or four days, while frog eggs take from a week to ten days, depending on water temperatures. They emerge from the eggs in tiny spherical semi-transparent blobs with long, wiggly tails. Emergence from the eggs may precede complete development of a mouth; as soon as this latter is in working order the tadpoles begin feeding on minute plant and animal life with which marshes and ponds abound.

The length of time spent in the tadpole stage varies among species. In the case of bullfrogs, the tadpole stage lasts a year before the legs begin to develop. The process of metamorphosis from the fish-like tadpole to a full fledged frog or toad is one of Nature's wonders. During the tadpole stage, the youngling has fed with a voracious appetite, and stored considerable "fuel" in the tissues of the tail. The hind legs appear first, in the form of small buds which later develop into useful limbs. The front legs appear later in the same manner. The tail does not drop off. It is completely absorbed into the body during the development of the legs. Meanwhile, the head undergoes a change, with the development of jaws, air sac, and protruding eyes. The wiggle-tailed pollywog has become a frog, or a toad, as the case may be.

Having reached full development, toads leave their watery birthplace and migrate into the woods or meadows surrounding the ponds. Tree frogs, wood frogs, and leopard frogs go into woodlands or meadows surrounding their pond, and may move for considerable distances away from their place of origin. The following year they return to this or other water to begin the life process anew.

Food Habits

Frogs and toads are voracious eaters of any form of life capable of locomotion and small enough to swallow. No one knows for sure the extent to which frogs and toads keep harmful insects under control. It is certain that they are an important aid to gardening and agriculture.

The food of these creatures must have one essential characteristic. It must move. Many a pet frog or toad has starved to death surrounded by freshly killed but motionless insects. A frog will sit for hours oblivious to a fat beetle resting under his very nose while waiting for a fly or a bug to chance by. When an insect comes close enough to a frog to afford capture, the frog darts out an amazingly long tongue with a motion so quick the human eye cannot follow it. The tongue is coated with a sticky mucous that ensnares the insect and it is flipped down the gullet. Both frogs and toads will eat worms and caterpillars as long as these creatures move enough to attract attention. Toads are fond of earthworms, and will go into considerable maneuvering to get around to the front end of the worm so that it can be swallowed head first. In the case of a large worm, the toad may have to struggle for some time to keep the worm from crawling out from the short espohagus. Sometimes a frog or a toad will swallow more than he can handle, as in the case of the toad that ate a stag beetle and finally had to give it up when the beetle's sharp pincers began cutting up the toad's stomach.

Tree frogs lie along branches and large leaves of trees waiting for leaf hoppers and other small insects to come by. On the other hand bulfrogs, which never willfully leave their native pond, dive to the bottom to collect insect nymphs and other small aquatic life.

Hibernation-Aestivation

Other than a small amount of body heat generated through physiological processes, frogs and toads are cold blooded; i. e., their body temperature closely aproximates that of the surrounding water or atmosphere. In warm weather tree frogs and leopard frogs secrete moisture through their skins to serve the double purpose of getting oxygen into the blood stream and cooling the body temperature. Activity is in direct proportion to weather. In warm weather, frogs and toads are most active. When the weather or water cools they become less and less active. In

freezing weather they become almost completely dormant and will burrow into the bottom of a pond or under moist leaves in the woodland and hibernate until warm weather returns.

A phenomenon corresponding to hibernation occurs during the summer time when the weather is warm but a lack of rainfall dries the pond or the surrounding terrain. In such circumstances they go into hiding again and become extremely inactive. This act is called "aestivation." Both frogs and toads can stand considerable freezing as long as the vital tissue is not damaged, and can recover completely.

Enemies

Except for the skin-secreted repellent fluid of toads and the agility of frogs, these animals are almost entirely without defense. Hence their enemies are legion. Any number of animals may eat up the eggs. Tadpoles are vulnerable to fish and even large aquatic insects and insect nymphs. Hawks, owls, and other predatory birds feed on mature frogs, and frogs are a favored food of game fish. Snakes are fond of frogs, as are mink, otters, and raccoons.

Fortunately, single adult females lay thousands and thousands of eggs, and enough of these result in mature creatures to insure the continuation of the breed.

As if any imposing number of natural enemies were not enough, Man has learned that frogs are delicious eating. Only two species are considered big enough for human food. These are the bullfrog and large specimens of the leopard frog.

As Food And Sport

North Carolina may some day have to place bullfrogs on the protected list of wild creatures. It might require the wisdom of Solomon, however, to decide whether frogs should be taken by authority of a fishing license or a hunting license. They can be both hunted and "fished". Where bullfrogs have become popular as table food in other states, they have been given legal protection with closed seasons and bag limits.

Bullfrogs furnish a great deal of sport and food for Tar Heel giggers. A warm, still, summer night seems best for maximum results with the pond jumpers.

PHOTO BY TOM ROLLINS

The meat of frogs is clear, white and of exquisite texture and flavor. In northern cities it commands premium prices in expensive restaurants. The demand for frog's legs has become so great that frog farming has become a profitable business in recent years.

The two most popular ways of getting bullfrogs are gigging (with frog spears) and angling. To gig frogs, frog hunters go out at night with a frog spear and a good flashlight. A little stalking skill enables the hunter to get close enough to the frogs to let fly with the spear. Other hunters go for frogs in small boats, and either spear them or grab them by hand.

In Oregon, bullfrogs are an introduced species and are protected by law. The only way bullfrogs may be taken legally in that state is by angling.

As has been pointed out, frogs will not feed on any object that is not moving. On the other hand, they will lash out their tongues at nearly anything that flashes by them. This makes them highly vulnerable to a carefully cast trout fly. Bullfrogs are shy creatures, and considerable caution must be exercised to approach them close enough for a cast. But once a fly or a bid of red flannel on a small hook has been moved in front of a bullfrog, the frog is hooked.

Although only the hind legs of frogs are commonly eaten, a great deal of good meat is wasted if the back, shoulders, and front legs are not put into the frying pan. Bulfrogs are easy to clean, and the meat resembles nothing so much as a young spring chicken. It can be prepared in the same way as chicken, and a gourmet will tell you it is far better eating.

A word of caution should be extended to the novice frier of frog legs. Frogs are extremely tenacious of life; a freshly killed frog rolled in batter and popped into the frying pan may try to pop out again. If you are a bit squeamish, it might be well to let the meat cool in the refrigerator a few hours before frying it. You, and the frog, will be less "jumpy" at mealtime.

Besides their value as controllers of insects and as food, frogs have been used for generations in the study of physiology. Anatomically, they are surprisingly similar to the human organism, and millions of frogs have been dissected in the school laboratory to teach physiology and anatomy.

Whether you eat frogs, submit them to the scalpel, or depend on them to keep your garden free of insects, they and their rough-skinned cousins are an important part of our life. Our springtime lowlands and meadow ponds would be lonesome places indeed without them. ◆

PHOTO BY USDA-SOIL CONSERVATION SERVICE

More Wildlife Through Strip Cropping

by Quentin Patterson
District Conservationist
Soil Conservation Service

STRIP cropping for wildlife? Sure.

"It benefits them as much as it does us," says Sam Woods who with his brother Lynn and father Roy, operates a dairy farm and wildlife area in Schley community.

"In fact, it may be worth more. It means good soil and water use to me, but to them it may mean life or death."

"I keep thinking of the old fable of the mother quail having to move her little brood out of the wheat field when harvest began."

Sam and his father, Roy L. Woods, find that edge conditions created by strip cropping favor game such as quail and rabbits.

"They still have to move—but with this strip cropping it's only a short distance they have to go—like moving to another room."

The field in question on the Spring Crest Farm is one on which they arranged their rotation in a parallel, strip cropping system.

Edge conditions—so suitable as wildlife habitat—are created by the grain and clover adjoining the row crops.

On some of the steeper parts, the Woods use a three-year rotation. This is a sequence of corn, small grain with red clover, and second year red clover.

On the more gently sloping sections it is an alternate of corn and small grain with lespedeza.

This was an unusual year, they point out, and in some areas weeds get ahead of the lespedeza.

"That's not so good for us," they say, "but the birds and animals don't care."

About 14 miles of edge created by strip cropping exist in this field—room for cover and food-producing conditions for quail and other wildlife. ⬍⬍

Wildlife Photo Contest Winners - 1972

"The best crop ever", said the judges of this year's entries. First Place is on our cover, and we hope that you agree with our decisions.

SECOND PLACE "Angular-winged Katydid" by Gerry F. Fedde
Nikon F, 55mm auto-micro lens, Kodachrome II

Honorable Mention, Murray Cragin
Orb-weaving Spider
Nikon, Kodachrome II

Honorable Mention, Dan Kern
Great Horned Owl
Nikkormat, HS Ektachrome

THIRD PLACE "Carolina Wrens" by Tally O. Bowman
Hasselblad, Ektachrome X

Honorable Mention, Daniel Lucas
Young Mockingbird
Fujica, H.S. Ektachrome

Honorable Mention, Alan R. Eakes
Cottonmouth
Pentax, Ektachrome (ASA 64)

Honorable Mention, T. S. Clay, Jr.
Young Osprey
Nikonos, H.S. Ektachrome

Honorable Mention, Tally O. Bowman
Garden Spider Web
Topcon Super-D, Kodachrome II

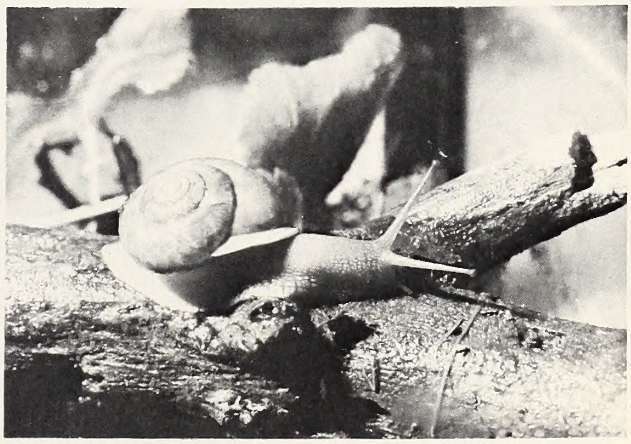
FIRST PLACE "Cattle Egret"
S. Duncan Heron, Jr.

Wildlife Photo Contest Winners - 1972

THIRD PLACE "Great Horned Owl"
Dan Kern

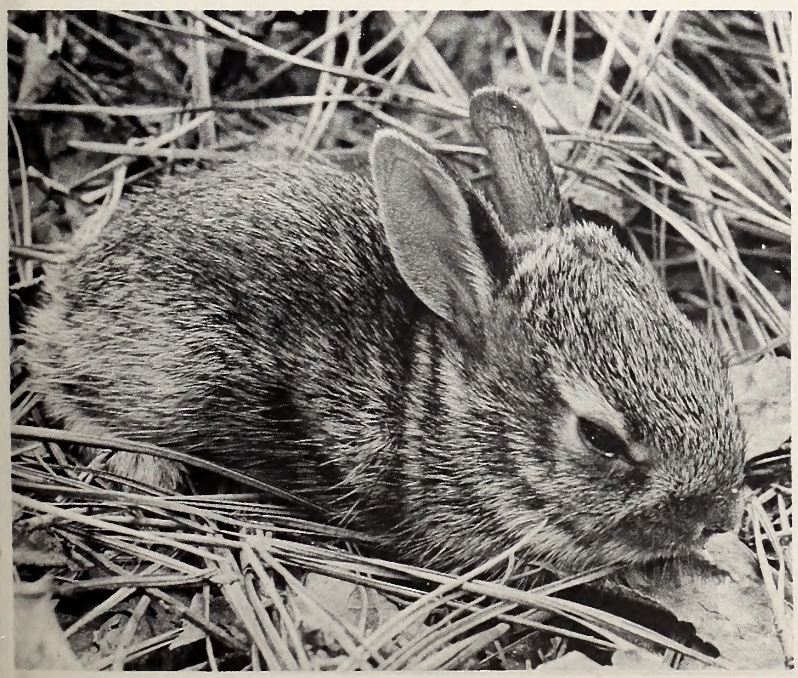
SECOND PLACE "Buck in Velvet"
Duke Tyler Scott

Honorable Mention, "Butterfly"
H. D. Daniel



Honorable Mention, "Land Snail"
Katherine Kocan

Honorable Mention, "Baby Rabbit"
Steven Heron



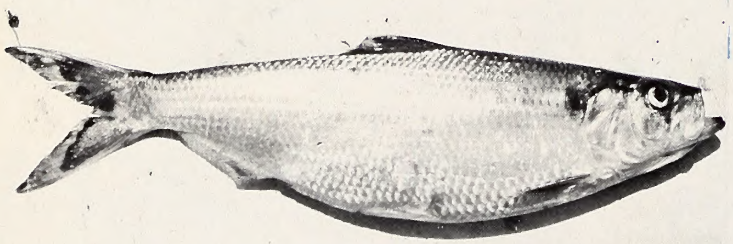
Honorable Mention, "Deer"
Johnny Mack Turner

The Anadromous Shad In The Spring Can Be Had

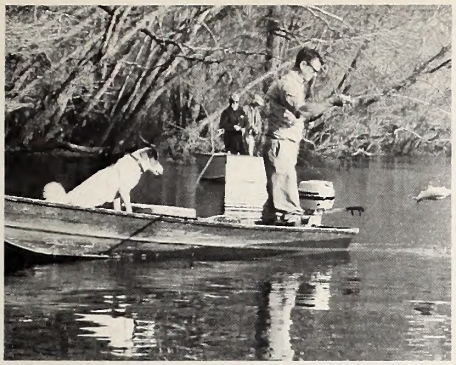
Shad fishing starts early, during spring spawning runs. Anadromous fish spend most of their lives in saltwater, returning to freshwater to lay their eggs. The young drift back to the sea.

Shad darts, small spoons and jigs are favorite lures; ask locally which work best where you plan to fish.

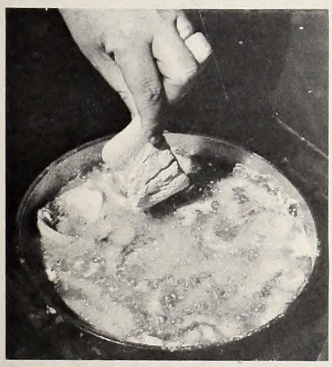
Good catches are important, but it's the strikes, jumping fish and pleasant hours on the stream that stay with a fisherman long after the last fish is cleaned and eaten.



The hickory shad (above) and the larger white shad both spawn in North Carolina's coastal streams. Don't confuse them with the inland, gizzard shad.



Everyone has a favorite trick; heavy duty shears (below) speed up scaling and removal of fins, tails and heads.



Man's best friend can't paddle a boat, run a motor or add to the catch, but his interest and enthusiasm insure free rides—with meals thrown in!

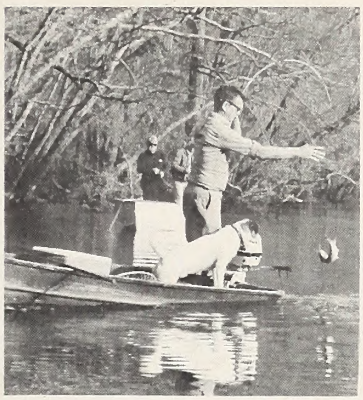
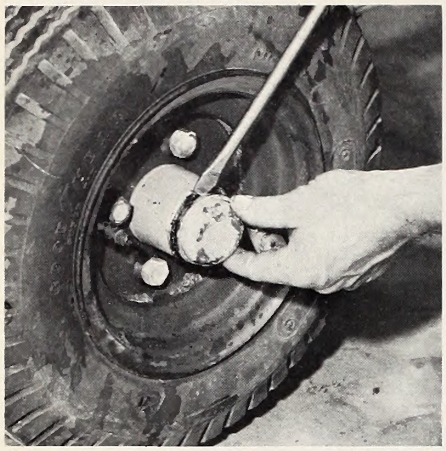


PHOTO FEATURE

By Rex Schmidt

Dressed-out, it's into the frying pan (left). Look good? It is. When shad are running, and fishing's good, clusters of boats, 20 or 30 feet apart, may add several hundred shad to stringers in a matter of hours. Grifton thinks shad, with a festival and Shad Queen. The big event this year is April 13-15. Y'all come!

STEM TO STERN•by Ed Jenkins•BOAT TRAILERS



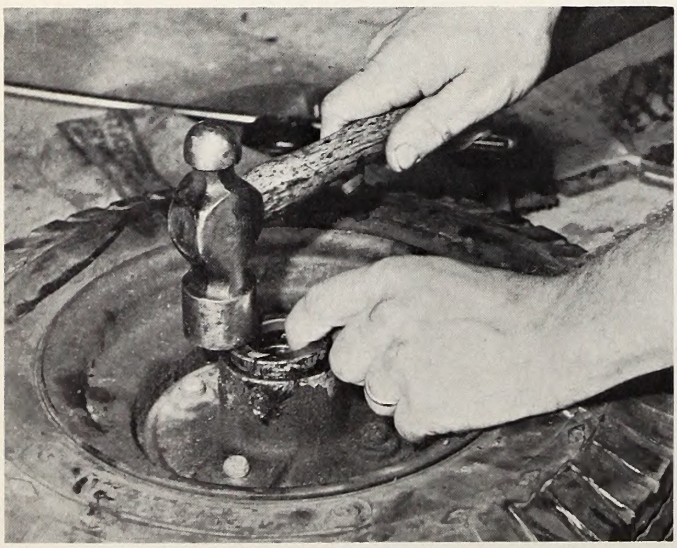
Ask yourself what type of treatment does your boat trailer receive. When was the last time you lubricated the winch, coupler, tilting mechanism, rollers and moving brackets? When you launched and retrieved your boat, did you stop the trailer before the water covered the hubs of the wheels? If your boat is stored on the trailer, during the winter, have blocks been placed under the axle to remove the weight from the tires and to prevent flat spots or tire rot? Have wheel bearings been inspected and repacked with grease since the summer? Have you touched up rust spots and chips before they grow and cause trouble? After use in salt water, did you rinse off the trailer with fresh water?

The truth of the matter is that most people do not realize how little time and effort it takes to care for the trailer. All the maintenance your trailer needs can be done in 30 minutes in your own backyard.

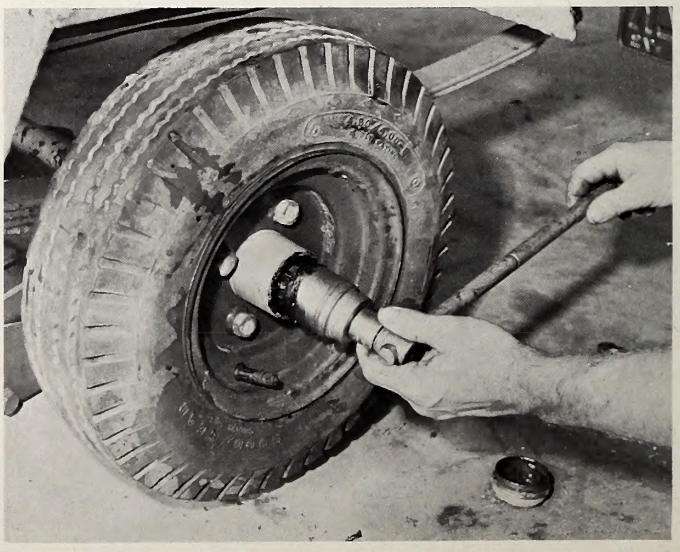
First, raise the trailer with a jack to take the weight off the wheels. Now remove grease cap from each wheel (above). Next, remove cotter pin and axle nut. The hub, which includes the inner bearings and grease seal, will now pull off the axle (lower left). The grease seal and bearing are now removed from hub (lower right). Force out with wooden object if necessary.

Wash and clean wheel bearing with kerosene. If bearing is rusted or pitted, it and bearing race should be replaced. Then, thoroughly cover bearing with water-resistant grease.

Grease seals should be replaced each time the wheel is repacked. Force the seal into the inner hub until it is flush with the end of the hub.



Finally, place the wheel on axle and tighten axle nut. Make sure that the axle nut is not tight enough to keep the wheel from spinning freely.



NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Hunting Ended February 28

February 28 marked the end of the general upland game seasons in North Carolina except for foxes where local laws may be in effect. Only remaining major season is the spring gobbler turkey season set for April 21 to May 12.

No More Ink For Fishing Tourneys

Beginning with this issue, WILDLIFE will no longer give publicity to the growing number of fishing tournaments involving valuable prizes of cash and merchandise. The number of tourneys is growing rapidly, and we do not have space to publicize them all. We prefer to advocate fishing for sport rather than fun and profit.

Crows to be Protected?

A year ago the U. S. signed a treaty with Mexico to protect 32 more species of migratory birds. Included in these are bluejays and common crows. Now the U. S. Department of the Interior wants to hear from crow hunters and farmers as to the advisability of protecting crows at least part of the year. The Interior proposal would provide for 124 crow-hunting days each year with states given the responsibility for establishing regulations within the 124-day period. Crows occur in all 48 contiguous states but do not occur in Alaska or Hawaii.

The proposal provides that crows may be killed at any time when they may be committing depredation on crops or other property.

Plenty of Game Lands Maps Available

The Wildlife Commission's Division of Game still has a good supply of current game lands maps available free of charge. Although the hunting seasons are closed, the maps are still valuable to sportsmen since the $6.00 game lands use permits are good for fishing on these lands as well as hunting. Many prime trout and warmwater fishing areas are located on game lands.

A Child's Garden of (Wildlife and Other Things) Verse

WHAT IS WILDLIFE?

What is wildlife?
Something you can hear?
Like a singing robin?
Or a prancing deer?

What is wildlife?
Something you can see?
Like a bright red cardinal?
Or a small chickadee?

What is wildlife?
Something with a glitter?
Not many,
Because of man's litter.
By Steve Musten

I wish every animal were free.
So they could run and play with me.
I like every animal I see,
Even the tiny bee.
Beth McLead, age 10, Farm Life School

Fire is good for heat.
Fire is good to cook our meat.
But when it gets in the trees,
Then it will spread with every breeze.
Joel Simpson, Farm Life School

I saw a baboon at the zoo,
And I'm convinced he saw me too.
As he looked up with lonely eyes
His gaze appeared to my surprise.

Intelligent, human and bold,
It was a wonder to behold.
He looked just like a tired old man
Trying hard to understand.

What was he doing sitting there?
Where everyone could come and stare.
My heart went out to that guy
Who sat all caged up and knew not why.

by Adam Marsh
Age 11, Farm Life School

The forest is made of lovely trees.
On the trees you will find nice green leaves
If all of us care,
They will put oxygen in the air.
Tammy Dowd, Age 9, Farm Life School

Bobby is a beaver who builds little dams.
Willard is a wolf who scares little lambs.
Freddie is a frog who lives in a bog.
Charlie is a chipmunk who hides in a log.

Clara is a cow who stands by a fence.
Martha is a mouse who hasn't much sense.
Percy is a pig who never cleans his sty.
Otis is an owl who has a piercing eye.

Mable is a monkey who hangs by her tail.
Maudie is a fish who swims in a pail.
Dannie is a dog who chases after squirrels.
Orville is an oyster who manufactures pearls.

Katie is a cat who washes every day.
Billy is a boy who always wants to play.
Anita is a girl with ruffles on her dress
Lovely is a life that's full of happiness.

by Alma Ruth McNeill
Age 11, Farm Life School

Let's start a club
Called Conservation,
And start cleaning up
And saving our Nation!
Edna Hearne, Age 10, Farm Life School

Please don't kill the snakes
With old rusty rakes.
Please don't harm the fish,
Or there won't be any in your dish.
Kim Sheffield, Age 10, Farm Life School

Put out campfires after camping
With water, sand and stamping.
Don't burn any of the trees,
Or any of their pretty leaves.
Liza Jones, Age 10, Farm Life School

Farm Life School, located between Carthage and Southern Pines, contributed these thought-provoking verses to contemplate.

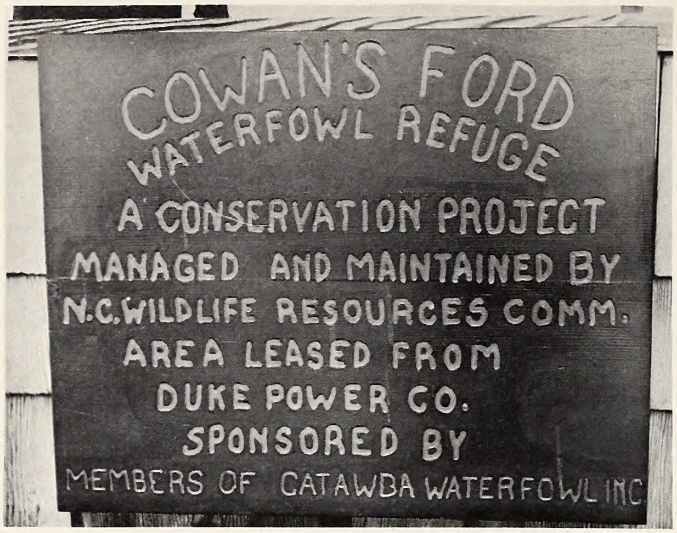
THE MOST LOGICAL FROG©

by

JANE & DERRY WALKER

HI, BOYS AND GIRLS! GUESS WHY I'M NOT IN THIS PICTURE! (I **GAVE** MR. SKUNK PLENTY OF ROOM!) IN SPITE OF HIS POWERFUL DEFENSE WEAPON, MR. SKUNK IS A GOOD FRIEND OF MAN, FOR HIS FOOD IS MOSTLY INSECTS, SUCH AS ARMY WORMS, TOBACCO WORMS, GRUBS, GRASSHOPPERS, POTATO BUGS, AND OTHER HARMFUL INSECTS. SKUNKS LIVE IN DENS, USUALLY ON HILLSIDES. REMEMBER, MR. SKUNK IS OUR FRIEND. (BUT GIVE HIM PLENTY OF ROOM, LIKE I DID!)

L. F.



Officials of Catawba Waterfowl, Inc., watch ducks and geese from an observation structure near one of the impoundments. These water areas were constructed as resting, feeding and possible nesting sites for resident and migratory waterfowl.

by Hal Atkinson
Supervisor, Central Game Lands

THE Cowan's Ford Waterfowl Refuge lies just below the Cowan's Ford Dam on Lake Norman, and its 3,000 acres serve as a winter refuge for several thousand ducks and geese that migrate along the Catawba River. The refuge property is owned by Duke Power Company and is leased to the Wildlife Commission on a long term basis. Although Duke Power Company has been more than enthusiastic about the possibility of increasing the waterfowl population in the Lake Norman area, it was the members of Catawba Waterfowl Inc. that provided the initiative to establish this area. As a result of their dedication to this cause, the Wildlife Commission, at its meeting on June 11, 1962 voted to establish a waterfowl refuge at this site.

The refuge is considered a segment of the Central Game Lands and as such, is managed by game land development work crews that are responsible for marking the boundary and carrying out the waterfowl management plan developed by the Commission's Waterfowl Biologist, Jack Donnelly. To insure proper crop management, soil tests were made and consultations held with the Soil Conservation Service. Forty-two acres of small grain crops such as wheat, annual rye grass, and orchard grass and clover are rotated to provide winter grazing for the waterfowl and also serve as a seed crop for the young goslings in the spring. Initially several acres of corn were planted, but experimentation proved that it was less expensive and more effective to buy corn and scatter it as needed. Fields on the refuge are maintained by mowing when not in cultivation and several permanent pastures are planned to help sustain the budding deer population.

During the first winter of operation in 1962-63, the refuge had a wintering population of 14 Canada geese and 450 ducks. This population has grown to the point that during the winter of 1971-72 the refuge held some 275 Canada geese and 3,500 ducks.

The Wildlife Commission and Catawba Waterfowl embarked on another successful venture during the 1972 nesting season when the members of Catawba Waterfowl constructed (from materials provided by the Commission) artificial nesting platforms for the resident goose flock. A total of 36 goslings was raised. With the help of Mr. John Minick, Federal Game Agent, all of the resident geese were banded, for another first on the refuge. It is hoped that these banded geese will give valuable information on the movement of the resident flock at the Cowan's Ford Refuge.

The success of the Cowan's Ford Waterfowl Refuge can be attributed to cooperation by Catawba Waterfowl Inc., Duke Power Company, and the North Carolina Wildlife Resources Commission. Technical knowledge and management is provided by the Commission's Division of Game, and game regulations are enforced by the Division of Protection. Duke Power Company has been more than co-operative in making the refuge property available to the Commission with nominal lease agreements. But most of the credit for the success of this venture goes to the members of Catawba Waterfowl Incorporated, who thorugh their untiring efforts have sustained the interest and support necessary to keep this project going and growing. ◆

Environmental Conference Planned

Members of the agricultural and industrial community, educational and governmental leaders, and other interested citizens have been urged to attend Regional Environmental Education Conferences to be held in the spring.

Dr. Arthur W. Cooper, Chairman of the Governor's Task Force on Environmental Education, stated that the regional conferences will be "instrumental in the establishment of a statewide system of broad communication and coordination among the many environmental groups and programs now existing in the State."

Brentwood Lodge in Washington, N. C. is the site of the first conference to be held March 8th and 9th for the Coastal Plains Region. The Central Piedmont Regional Conference is slated for April 7th in Burlington. Other conferences will be held for the mountains, Piedmont Triad area, Charlotte area and Southern Coastal Plains, with dates and sites to be announced in the near future.

The goals of the conference include: an inventory of existing and planned programs and unmet needs in the area of environmental education; the organization of macro-regional network committees, and preparation for other network committees on the county and local levels.

The conferences are jointly sponsored by the Department of Administration's Office of Environmental Education and Outdoor Beautification, and the North Carolina Environmental Education Program, a coordinated effort of ten State universities.

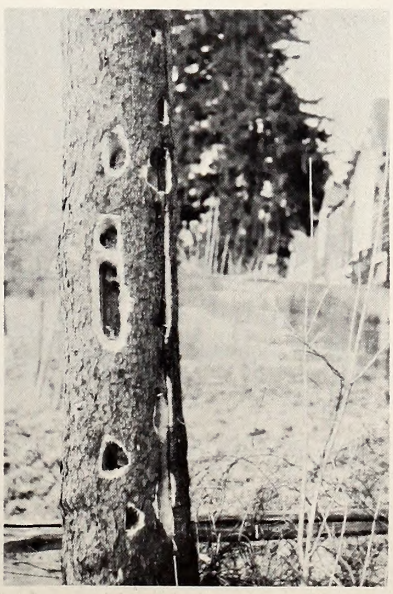
Additional information and registration procedures are available from Mr. Eric Slaughter, Urban Affairs and Community Service Center, North Carolina State University, Box 5125, Raleigh, North Carolina 27607, 919-737-3211; or Tom Baines, Office of Environmental Education, State Administration Building, 116 West Jones Street, Raleigh, North Carolina 27603, 919-829-5896.

Pileated Woodpecker

Dear Sir:

We have had the good fortune to have a pileated woodpecker on our place for the past few years. Based on these observations, I would like to supplement the information given to Mr. J. Pugh, Jr. as published in the August 1972 issue of Wildlife in North Carolina.

The pileated woodpecker is indeed a shy bird, but we have seen this one on several occasions, both stationary and in flight. Their flight pattern has a characteristic swooping motion and in flight, with the strong beak thrust forward, their silhouette reminds one of a small pelican, though of course much smaller. A favorite food of the woodpecker is carpenter ants and they attack an infested tree with great vigor. A characteristic cavity made in a spruce tree approximately 1 foot in diameter is shown in the accompanying photograph. When working on a tree one can hear a series of irregular loud chops. The chips resulting from this work are frequently a half inch across and about two inches long, which gives some measure of the strength of this handsome bird.



I hope you will find this information useful.

J. H. Scaff
Bernardsville, N. J.

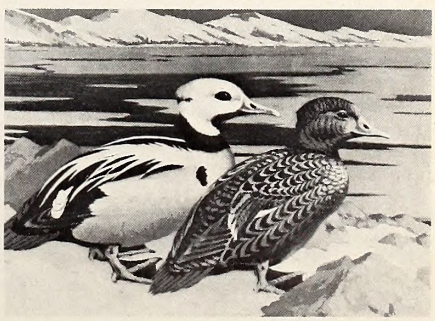
REVISED DUCK STAMP BOOKLET ISSUED

The Interior Department's Fish and Wildlife Service announced recently that a sixth edition is available of "Duck Stamp Data," a 48-page booklet which pictures and describes the 39 Federal hunting stamps issued to date.

"Duck Stamp Data," of interest to philatelists, sportsmen, and other conservationists, reviews the origin of the Duck Stamp, reports on how money from stamp sales is spent, and explains how a new stamp is selected each year.

"Duck Stamp Data," also known as Fish and Wildlife Circular 111, is available for 30 cents from the Superintendent of Documents, U. S. Government Printing Office, Washington, D. C. 20402. Stamp clubs and individuals will be given a 25 percent discount upon purchase of 100 or more copies going to one address. When ordering, please specify GPO Catalog Number I 49.4:111/6, Stock Number S/N 2410-0328.

The 1973-74 Federal Duck Stamp will show two Steller's eiders standing on a rocky Arctic shore, the Interior Department's Fish and Wildlife Service announced recently. The winning entry, a full color wash drawing, was created by artist Lee LeBlanc, 59, of Iron River, Mich.



KNOW YOUR PROTECTOR

Wesley L. Cook

Mr. Wesley L. Cook was born October 1, 1943, in Durham County. He attended Hillsborough High School in Hillsborough, N. C., and graduated in 1961.

Prior to his employment with the N. C. Wildlife Resources Commission he served four years with the U. S. Navy as a Data Processing Technician stationed in Washington, D. C. Upon release from active duty Mr. Cook was employed with Burlington Industries as a Computer Operator.

Mr. Cook completed the preservice training school for wildlife protectors in July, 1967. He was employed with the N. C. Wildlife Resources Commission on January 1, 1968, as a wildlife protector and stationed in Guilford County. November 1, 1971, Mr. Cook was promoted to Wildlife Patrolman and transferred to Butner, N. C. Since employment with the Wildlife Resources Commission Mr. Cook has completed five in-service training schools at the Institute of Government at Chapel Hill, N. C.

For the past four years Mr. Cook has been involved with the water safety activities in District Five and in 1971 he scheduled and presented water safety programs before approximately 6,140 students and parents.

Mr. Cook is a member of the N. C. Law Enforcement Officers Association, State Employees Association, Southeastern Association of Game and Fish Commissioners and is a National Rifle Association Hunter Safety Instructor.

Mr. Cook is married to the former Patricia Forrest of Hillsborough, N. C., and they have two daughters, Kimberly, age 5, and Kelly, age 1 year. The Cook family attends the Methodist Church in Butner, N. C.

Need An Exhibit?

A display unit designed and constructed by the Wildlife Commission's Division of Motorboats and Water Safety centers around an actual burned-out fishing boat and warns about the dangers of gasoline fumes. This exhibit is available for the boat shows and other outdoor recreation-oriented shows. Interested groups should contact Ed Jenkins, Wildlife Commission, 325 North Salisbury, Raleigh, N. C. 27611.

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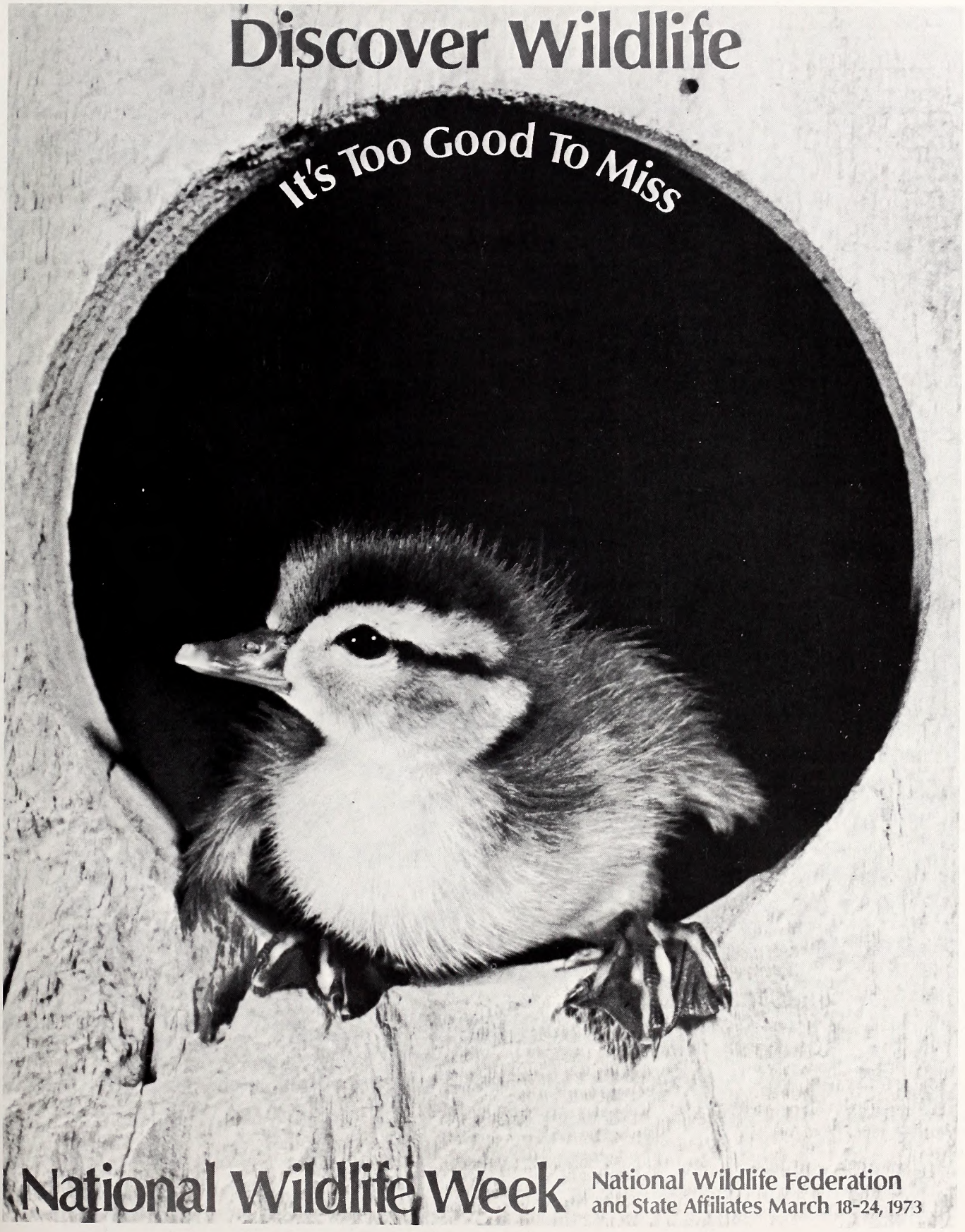

A young wood duck popping out of its nesting box is as much a part of Spring as the annual celebration of National Wildlife Week (March 18-24, 1973). Soon he will grow to become one of the most spectacular waterfowl. Photographed by Jack Dermid, this poster photo highlights the Wildlife Week theme, "DISCOVER WILDLIFE—It's Too Good To Miss", this year's spring reminder from the National Wildlife Federation.

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PHOTO BY KARL MASLOWSKI

Lunch Time

Will you see a nesting bluebird this spring or summer? Are they making a comeback from perilously low numbers? We hope that the answer is "yes" to both questions, but only time will tell. This male is delivering a moth to a family in an old post cavity.

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 98,935

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 4 APRIL, 1973

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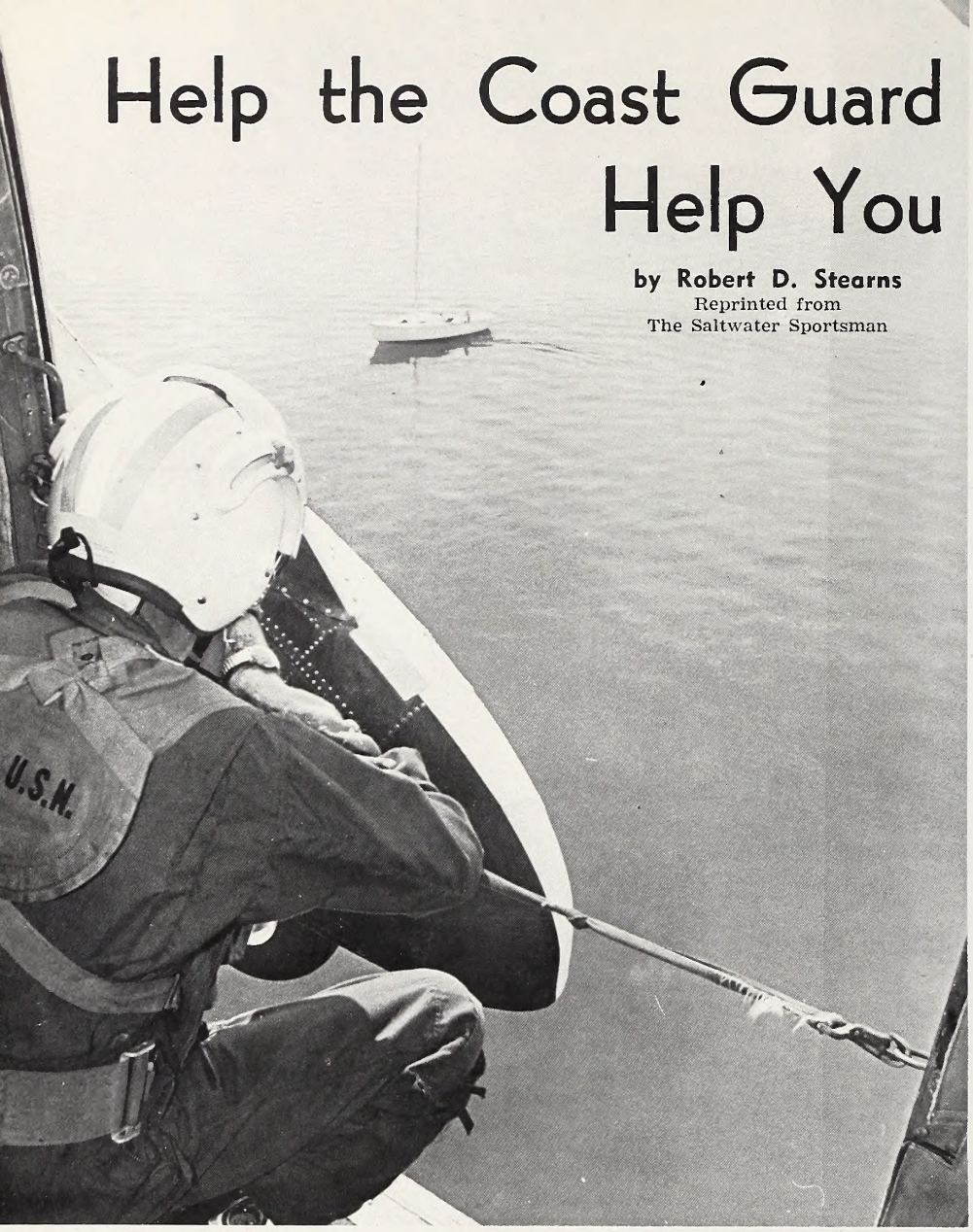
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

The number of miles of fishable small streams in our State probably has never been recorded. And even with the inroads of pollution, siltation and general bad land-use practices, fine fishing is still available. Our cover angler has selected a Piedmont stream, light spinning tackle, and waders for his spring outing. The photo was taken by Rex Schmidt.

Help the Coast Guard Help You

by Robert D. Stearns
Reprinted from
The Saltwater Sportsman



WE were approximately four miles away when we saw the superstructure of the 52 foot cabin cruiser explode in a huge orange ball. Within seconds a thick column of black smoke followed, and flames were visible over almost the entire length of the hull.

I put in a mayday call to the St. Petersburg Coast Guard as we raced for the blazing boat at 30 knots. It took eight minutes to reach the unfortunate vessel and two more to locate its sole occupant, burned and in shock, but still alive. Even as we lifted him aboard his life raft, only a few yards from the roaring gasoline fire, we could see a Coast Guard helicopter coming over the horizon. By the time we had retired a safe distance from the doomed boat, the 'copter was overhead and the litter basket had already started to descend.

The unfortunate skipper was under treatment in a hospital less than 30 minutes later.

You can't beat that for service! And, thanks to an organization that is wholeheartedly dedicated to keeping you out of trouble on the water, there are many individuals alive to go to sea again who would otherwise have joined the other unfortunates in that large subsurface apartment operated by Mr. D. Jones.

When you consider that the Coast Guard search and rescue teams must often go out in the middle of the night; and not infrequently during the worst weather—that seems to be the most popular time for getting into trouble—and risk their own personal safety to bail you out of trouble, then I don't think it is possible to give them too much credit for the fantastic job they do.

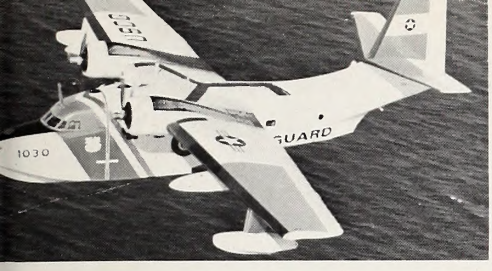
Still, there's a great deal you can do to help them. Particularly when they are out trying to find *you*. Here are some very excellent suggestions passed on to me by some of the seasoned Coast Guard officers at the USCG Air Station in Miami, Florida. These men are pilots of both helicopter and fixed-wing aircraft, and have been exposed to many search missions. I have divided their information into six categories for simplification.

A. Emergency signaling devices:

There isn't much the Coast Guard can do to help you until they *locate* you. Just knowing that you are in trouble isn't enough. The sooner you can make the search plane or boat *see* you, the sooner you will be rescued. Anything you can do to attract attention is to your definite advantage.

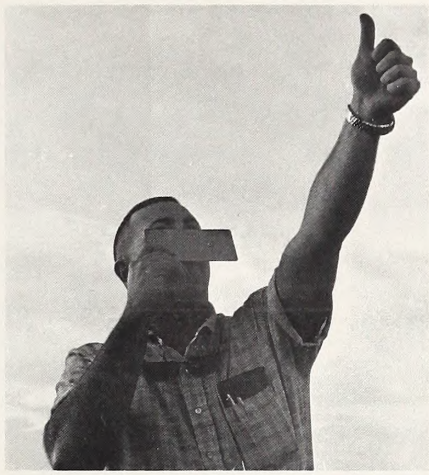
By far the best daytime signaling device is the mirror. It will work on just about any day when there is enough sunlight to cast a distinct shadow, but the brighter the sunlight, the greater the effective range: *up to 40 miles on a clear day!*

There are many mirrors commercially available that are specifically designed to serve as a signal. They can be purchased from many mail order firms, marine supply stores, aircraft equipment supply firms, and sometimes military surplus stores. They have an optical sighting device in the center, and usually there are printed instructions on the back explaining how to use them. Some of the new models are unbreakable, small, and easily stowed. They usually cost $3 to $5.



U. S. COAST GUARD PHOTOS

Coast Guard patrol aircraft include this specially equipped Grumman "Albatross". Helicopters also are used in rescue work. Cuban refugees are shown here being brought aboard by means of a litter basket.



Above left, Mark Sosin demonstrates method of using an ordinary mirror with his thumb as the front sight in signalling. The bright flashes are spotted by a flying Coastguardsman who uses binoculars to see if a craft is in trouble or if the light is just bouncing off a windshield.

Just about any mirror will suffice in an emergency, but they will not have the aiming device built in. There is, however, a very simple method that will enable you to aim any mirror at a passing boat or aircraft; hold the mirror in front of your face, just below the level of your eyes, with your right hand. Extend your left arm with closed fist, thumb upwards, like the front sight of a rifle.

That's just what it is—a sight. By placing the thumb just below the "target" boat or plane, and flashing the light from the mirror across your thumb, you will be "shooting" in the right direction.

It isn't important that you spell out any message, or even flash in any particular sequence. Just keep flashing away until the "target" comes over to investigate the cause of all the bright light. It is important that you keep the flashing going, so an observer on the "target" won't mistake your mirror for a windshield.

Even if there isn't any "target" visible, it is a good idea to keep constantly flashing all around the horizon. The light from your mirror will travel a great deal farther than you can possibly spot a boat or a plane. Also just about any commercial or private aircraft pilot that spots your flashes will radio your position to the Coast Guard—provided your flashing appears too intense to be passed off as random.

You don't need a mirror the size of the one on your bathroom wall. A 2 x 4 inch pocket mirror, a brightly polished piece of metal, or sometimes even a piece of broken glass will work. The small round mirror in your wife's cosmetic compact will do a fine job. A stainless steel shaving mirror, if you can find one (they used to be common in military surplus stores), is really great. About 4 x 6 inches in size, they are especially nice because they are unbreakable.

Another device that is visible for a good distance is the orange smoke flare. They put out enough smoke on a calm day to blanket a city block, and the color is so bright that you would have to be totally color blind to overlook it. High winds will quickly disperse the smoke, causing it to trail downwind in a long, thin column, so wait until you have a "target" close enough to see it before you use it. You should have at least three of these flares on board at all times. They aren't expensive: usually $3 to $5 each.

The military Mark 13 Day/Night flare is also commercially available. One end is orange smoke for daytime, the other a bright red flare for night. They usually cost about $8 each.

You can attract a great deal of attention by making any smoke, but don't ignite your boat to do it. Paper or rags soaked with a gasoline/oil mixture and tied to a pole or oar and held well away from the boat on the downwind side will be visible for many miles. Anyone seeing the thick smoke will certainly investigate. A great deal of caution must be exercised when using this method; a fire on board your already disabled boat is the very last thing you need!

A dye marker can't be seen from as far away as smoke, but it will certainly attract attention —and it cannot be dispersed by wind. It will even stay put for a surprisingly long time in rough seas. It comes in a bright color, usually fluorescent green, red, or orange, and is especially visible from an aircraft. It can be purchased at the same places as the mirrors or smoke flares, and the cost is usually about $3.

Don't overlook a flare pistol as a daytime signal device. Its bright red aerial flare is quite visible for respectable distances, particularly if it is too overcast for your mirror to work. A pistol or tube type launcher will cost from $12 to $50, depending upon size and type. The flares them-

selves cost from $1.70 to $10, also depending upon size and type.

Flashing in groups of three or SOS with a powerful flash light can be seen for a greater distance than you would believe at dawn or dusk and during a heavy overcast. It worked for me once; a little three-celled flashlight saved me from a long, cold night on the water.

Don't waste the "one time" signal devices, such as flares, smoke, or dye on "blind shots." Wait until you have a "target" in sight. It could be a disaster if you ran out of signals before a plane or boat came into view.

Once you have attracted a "target" to your vicinity, don't just let it go at that. Wave your arms, a shirt, or a flag over your head *vigorously*. Make sure you use *both* arms if that is all you have to wave with. Ditto everyone else on board. A one arm signal might be misinterpreted for a friendly "okay" wave.

If your upper deck or cabin overhead isn't very light in color, it is a big help to have something large and white on board for printing messages. A wide-tip marking pencil or crayon is a very satisfactory writing instrument, and the back of a marine chart makes an excellent letter board. A fixed-wing plane cannot hover like a helicopter, and the crew must be able to read your message as they whiz past at 130 mph. Make it short, and in large letters.

And simple. The name or side numbers on your hull, and one or two words to explain your trouble: i.e., "GAS", "SINKING", "SPARK PLUGS," etc.

Even though the fixed-wing aircraft primarily used for search missions by the Coast Guard is the amphibious "Albatross" (HU-16E), don't be alarmed if it circles a few times and flies away instead of making a water landing. It carries only just so much fuel, and cannot remain with you indefinitely. Also, it is not Coast Guard policy to make a water landing unless human life is at stake. In spite of the terrible physical discomfort it may produce, seasickness *does not* fall into this category.

Once you have been located and identified, the circling aircraft will radio your position to the nearest surface vessel that can render assistance, and also request additional rescue equipment to be flown out by other aircraft if necessary. Most of the search planes carry emergency drop equipment, so there is usually no delay in getting it to you unless it has already been dropped elsewhere.

If you are stranded after nightfall, the most effective signaling device obviously is the aerial flare. The so-called parachute flare is the best of all, since it is very bright and, as its name implies, falls very slowly from the top of its trajectory. Cost of this type flare is fairly high, usually somewhere near $10 each (not including the gun, which is usually $20-$50). You don't use them very often (I hope!), but if you like to fish far out at sea, they are your best insurance.

The same gun can also fire the standard "meteor" or "star" shells that burst into three separate smaller flares at the top of the trajectory. These shells cost only a few dollars each.

The next best thing to an aerial flare is the bright red hand-held flare. The "night" end of the Mark 13 is just such a flare, as is the standard railroad flare or "fusee." All of these hand jobs should be self-igniting, but just the same it is a good idea to keep a few boxes of *safety* matches in a waterproof container.

A good, powerful flashlight or hand lantern is a must. It should contain its own batteries so that a failure of the boat's electrical system won't put it out of business. It is an excellent signaling device by itself, but in order to be really effective it should be used in some sort of code pattern. The best signal is SOS: three short flashes, pause, then three long flashes, pause, and finally three short flashes. Wait ten seconds or so, then repeat the whole sequence.

If you cannot remember SOS, then use flashes in groups of three.

Several years ago a friend of mine was well out to sea when his motor quit. He drifted all day without so much as a glimpse of another boat (he also didn't have a mirror). When night fell he discovered he didn't even have a flashlight. Being a non-smoker, as was his companion, he had no matches.

As a final act of desperation, he began turning the boat's running lights on and off in the traditional SOS signal. An alert observer on shore recognized the signal, and called the Coast Guard. Two hours later he and his companion were drinking coffee on board the cutter that had his boat in tow.

Even if you have other signaling devices, the flashlight will serve to guide a search plane or boat right to your craft after the flare has gone out. It is a good idea to carry spare batteries in a waterproof container.

Any device that can make light is a help. One Coast Guard pilot told me of finding a disabled boat by the light from the skipper's cigarette lighter!

Don't overlook noisemaking devices, such as whistles. It is the usual practice of a searching boat to stop all engines for short periods and just drift and listen. A bell, whistle, gun, banging on the side of the boat or the bottom of an empty pail, a good pair of lungs—any of these can prevent a long night at sea if used at an opportune moment.

B. Survival at sea:

Once you lose locomotion, the first thing you should do is *try to maintain your position.* The smaller the search area, the sooner you will be located. Don't try to rig an emergency sail and make it under your own steam unless you know exactly what you are doing. Far too many boaters have managed to propel themselves right out of the search area without making it all the way to shore, with sometimes disastrous results.

Anchor if possible. This is the best way to stay put. And since it may be necessary to anchor in

deeper water than you normally would, carry some extra line.

One trick I picked up during a three year tour in Hawaii (courtesy of the U.S. Navy) has saved many a boater out there. The water is extremely deep very close to the shoreline of the entire island chain, and to drift out to sea could mean at least 2,000 miles to the nearest landfall. Many of the experienced Hawaiian small boat skippers carry a large spool of heavy monofilament fishing line. Since there is something like almost 500 yards of 100 pound test mono per pound spool, a few pounds would make it possible to anchor in very deep water. Carry enough mono for at least twice the maximum depth of water you intend to fish in.

The trick is to tie the mono directly to the anchor, or the anchor chain if you have one. The normally thick rope already attached to the anchor will only serve to slow its descent, so remove it. Besides, you might need it for a sea anchor later on.

It is surprising how much boat can be anchored in very rough seas this way, particularly in deep water. The mono is so stretchy it is almost impossible to break it.

If you cannot get a grip on the bottom, rig a sea anchor. It will not only help retard your drift, but it will also make the boat ride more comfortably if the sea is lumpy. The more drag you put over the side, the slower you will drift—as long as your sea anchor doesn't float.

Sometimes a makeshift sail can be used to help you maintain position, even if it cannot provide enough push to get you home.

Remember, if you have told someone where you will be fishing, and the Coast Guard is called, that will be where they will start looking first—the primary search area. If they cannot locate you within that area, it will be expanded. Now the same number of boats and planes will have to cover a much larger area, and so they will be considerably thinned out. It is to *your* advantage to stay put.

While you are waiting for assistance, assume you will be there for a long time and plan accordingly. Ration your water, and do not drink soft drinks or beer except as an absolute last resort. They will only serve to ultimately dehydrate you, especially the beer. Alcoholic beverages are the worst offenders.

Do not eat! Digestion requires extra water. You can last for several days without water.

Do not drink any salt water! It was once thought that existing fresh water supplies could be "extended" by mixing a little sea water with it. Recent studies by survival experts indicate that for each pint of sea water you consume, *an additional seven pints of fresh water are needed to offset the detrimental effects of the salt water!* Stick to fresh water; there is no substitute. Raw fish, in small quantities, will also provide a little fresh water to reduce thirst discomfort.

You need more water as the temperature goes up, so be sure to carry extra during the hot months. At least a gallon per person as a bare minimum. More if you can.

Carry extra clothing. You should have enough *dry* clothing to cover your entire body, plus a hat (the larger the brim, the better). Protecting your skin from the sun will prevent painful burns that could lead to shock, etc., and strongly reduce moisture loss through evaporation. It is also likely to turn cool at night, even during the summer. Fighting off a chill can also reduce your reserves of strength and your survival potential.

Stay dry if possible. Wet skin is softer and more easily torn, cut, or rubbed raw. "Dishpan" hands cannot grip a boarding ladder as securely as dry hands.

Carry sunburn lotion. The "sunscreen" type is really a must; "tanning" lotions are worthless in a prolonged exposure situation. Protect your face; there is a lot of reflected glare from the water that can with sufficient time produce a burn under the shade of your hat or the boat's canopy.

Relax, stay calm and alert. Needless exertion will only result in premature fatigue and might cause you to miss seeing a search craft. Keep at least one person awake as a lookout at all times.

C. The "float plan":

Although there is no federal agency with which to file this nautical version of the aircraft flight plan, the Coast Guard suggests that you "file" with a relative or reliable friend or neighbor.

Here is the information that should be included in your float plan:

1. Name of boat owner and/or captain.
2. Name of boat, if any.
3. Hull numbers (the letter and number combination on both sides of your bow).
4. Physical description of boat: size, shape, colors, etc.
5. Fuel capacity; type and size of propulsion.
6. Estimated maximum cruising range.
7. Radio equipment, if any—type, channels, and how monitored.
8. Time and place of departure.
9. Planned cruising and/or fishing area.
10. Likely alternates to 9, if any.
11. Estimated time and place of return.
12. Time Coast Guard should be called if you fail to return.

Be as specific as possible in the above information. The more precise you are, the easier the job of locating you. If you change your plans at the last minute, take a few seconds for a telephone call to advise the person who is serving as your "float guard."

Don't forget to "close out" your float plan upon your return. The Coast Guard has enough business as it is without burning up precious fuel and time chasing wild geese.

If you are in the habit of leaving your float plan with some

non-boating friend or relative, include a few names and telephone numbers of boating friends who are familiar with your boating habits; they can be invaluable in an emergency.

D. Assisting in your own rescue:

It is to your advantage to provide what assistance you can when help finally arrives, but be cautious. The Coast Guard advises that you *first wait for their instructions,* then do *exactly* as you are told.

The first step will be communication via radio (if available), otherwise a message drop (in a float) or a hand-held chalkboard (helicopter). A megaphone may be used from a surface craft.

Although the chances are good that an aircraft will be first to spot you, most likely it will be a boat that provides the actual assistance.

If there is an emergency where human safety is involved, a helicopter may be used to remove the injured via a litter basket. Be sure to make the situation clear to the first aircraft that arrives on the scene, if there is any way possible. Print the word "INJURY" if there is one on board, or "INJURIES" with a number to indicate how many if more than one person. Be brief and use large letters in the manner described earlier.

If removal by litter basket is indicated, lower or remove any masts, outriggers, antenna or any other obstruction that would impede the lowering of the basket or endanger the helicopter. When the basket is finally lowered, it will first be dunked in the water to eliminate the static charge built up by the rotors. Don't try to prevent it from touching the water—you might receive an unpleasant, though not dangerous, shock.

Move the victim to the clearest spot on the deck if it is safe to move him at all, but in any event no more than you absolutely have to. Once the litter basket has been dunked, help guide it to the area immediately adjacent to the victim.

Strap the victim in *securely!* It would be highly embarrassing to have him fall out on the way up.

E. Air drop equipment:

The Coast Guard has a variety of equipment especially designed to be dropped from aircraft in order to assist a boat in peril. But, just because your engine won't work, don't expect a shower of goodies from the sky when the plane with the diagonal orange stripe happens by. You will have to indicate a need by one of the methods outlined earlier.

Just for the record, here are some of the items most often available for emergency drops when needed. Most of them are carried as standard equipment aboard Coast Guard and other military search and rescue aircraft:

1. Pump: A high-capacity, gasoline-powered bilge pump in a watertight container. It comes with enough fuel for eight hours of operation, and complete printed instructions. *Read the instructions first,* otherwise you will probably destroy the pump and sink anyway.
2. Inflatable life rafts. You'll probably need them if you loused up the pump they dropped first.
3. Food and water.
4. A battery-operated two-way radio (for emergency use only).
5. Smoke floats or night flares. For marking your position only. Don't try to pick them up—they burn!

A handy trick that has saved many a savvy skipper from the deep six due to a busted hull is using the engine's water pump (for the cooling system) as a bilge pump. Some smart boaters even have a permanently installed valve system with a strainer-protected bilge pickup. Otherwise, simply disconnect the intake hose where it joins the through-hull fitting and stick it down in the bilge water. Also, don't forget to plug the through-hull fitting with a rag or cork—you won't need any new leaks at this particular point.

Remember, this trick is intended for emergency use only and shouldn't be used as a routine bilge flushing system, owing to the possibility of clogging the cooling system—a justified risk only if you are sinking.

F. Communications:

Coast Guard aircraft and surface vessels carry a wide variety of radio equipment, but they cannot carry everything in use on the water today. They are, however, continually adding to and upgrading the equipment they already have.

The primary frequency that is

• **continued on page 27**

Searchers for missing boats in the vastness of the oceans are aided by radio buoys which are dropped to establish areas of search patterns. There are many things that you, the boater, can do to aid the Coast Guard in these rescue operations.

Game Management— a Democratic Process

by Rod Amundson

GAME management can be a democratic process — at least to a degree. For more than 20 years the Wildlife Resources Commission has given Tarheel hunters and trappers a strong voice in establishing the annual regulations for hunting nonmigratory game and trapping.

Over the years the voices have been loud and clear; but always, despite the desires of individuals or groups for special consideration, the welfare of the wildlife species involved has been given first priority. This is necessary to a program of sound wildlife conservation.

The process of establishing hunting and trapping regulations is uncomplicated but thorough. During late winter and early spring, field men of the Commission make a survey of the winter carry-over of breeding stock of the various game and furbearing species. Their findings are reported to their supervisors (who helped with the survey). The supervisors take the information to Raleigh where they meet with staff officials to formulate a set of proposals. These proposals are then presented to the Commission at a regularly-scheduled meeting for further consideration and study. At this meeting the Commission agrees on proposed regulations to be presented at a series of nine public hearings — one in each of the nine Commission districts.

At these hearings sportsmen are given free and ample opportunity to express their views and opinions of the proposals and to present ideas or recommendations of their own. At each hearing all suggestions, opinions, and comments are recorded so they may be taken back to Raleigh for careful consideration and study.

During the period of the series of hearings the Commission receives many letters and other communications from people who wish to express their views but who are unable to attend the hearings. After the last hearing (April 19) the Commission office staff will be reviewing information obtained at and during the hearings, and will not have time to give significant consideration to further suggestions. This would only be fair to those who attended the hearings or presented their recommendations within the period of the hearings.

Once the hearings have been completed a thorough study and analysis will be made of all of the information obtained during the hearing period. From these the official regulations will be established by the Commission.

It should be emphasized that although it is impossible to incorporate all of the ideas brought out at the hearings into the established regulations, all are given careful and sincere consideration.

Following is the schedule of events involved in establishing the 1973-1974 hunting and trapping regulations:

On March 26 the Commission will meet to consider and agree on proposed changes in hunting and trapping regulations for presentation at public hearings in April.

Public hearings are scheduled as follows:

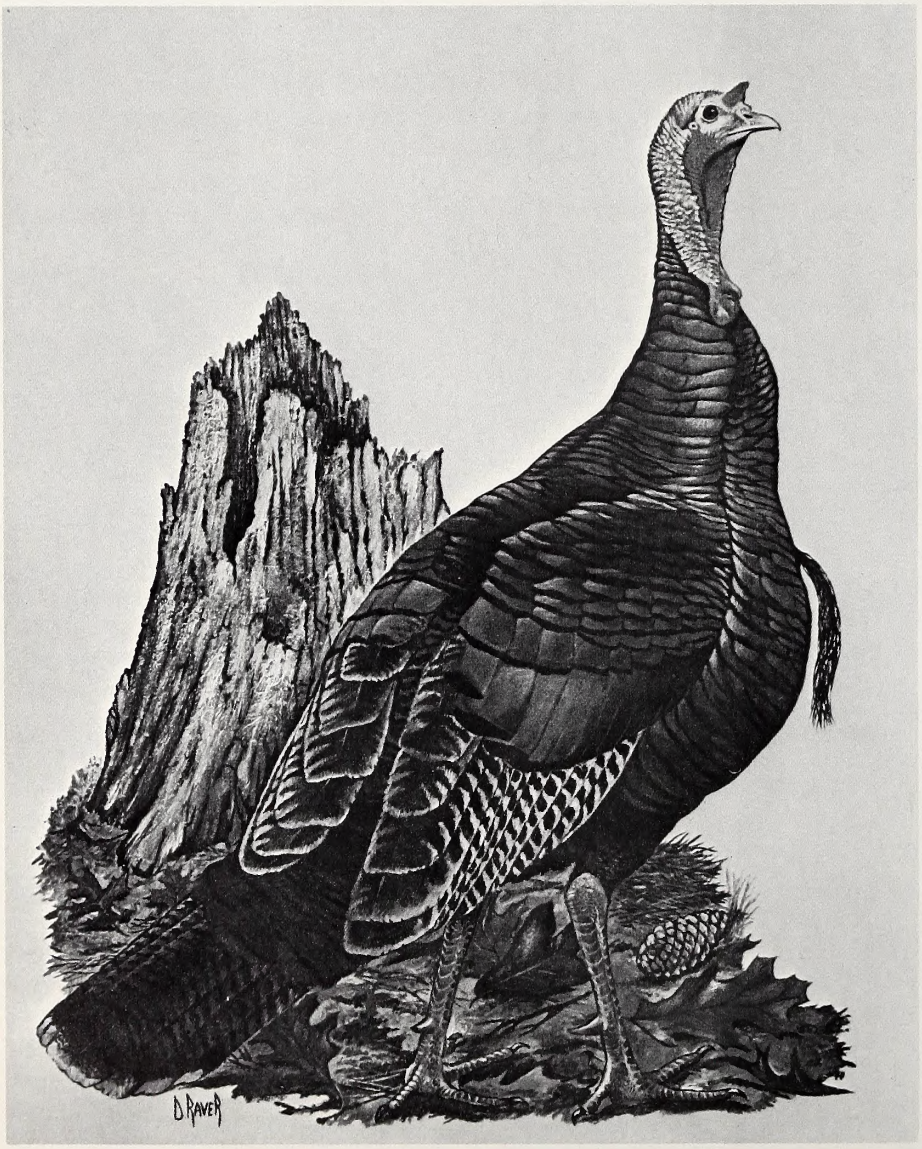
April 9	Edenton Courthouse	7:30 p.m.
April 10	New Bern Courthouse	7:30 p.m.
April 11	Rocky Mount City Court Room	7:30 p.m.
April 12	Elizabethtown Courthouse	7:30 p.m.
April 13	Graham Courthouse	7:30 p.m.
April 16	Albemarle Courthouse	7:30 p.m.
April 17	Yadkinville Courthouse	7:30 p.m.
April 18	Morganton Western Piedmont Community College	7:30 p.m.
April 19	Sylva Courthouse	7:30 p.m.

On Monday, May 14, the Commission will meet to adopt hunting and trapping regulations for the 1973-1974 season.

You will note that the hearings this year have been moved up about a month. This was done to ensure that adequate time will be provided to have the adopted regulations printed and distributed to license agents before the August 1 deadline when new hunting and combination hunting and fishing licenses go into effect, giving more people more time to buy their new licenses before the old ones expire. ◆

Turkey Summer

By John S. Wright
Raleigh



PAINTING BY DUANE RAVER

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DURING the summer of 1972 I was fortunate to be able to work as a Summer Intern with the Department of Natural and Economic Resources. The Summer Intern Program is designed to give college students a meaningful and challenging summer work experience while the department benefits from help with a specific problem. My job with the Division of Game of the Wildlife Resources Commission was to evaluate the success of recent wild turkey restocking efforts in two areas of western North Carolina. The job required that I locate as many of the released turkeys as possible, especially hens with broods, to determine whether the birds were present and reproducing, as is necessary for a successful release.

Investigations such as this are time consuming and often frustrating, but without them the wildlife biologist has no good way of gauging the immediate success of his restocking efforts—efforts which in recent years have been quite successful. It was not always this way, though, for the past history of turkey restocking is characterized by frequent failure.

In earlier days nearly all restocked turkeys were raised on game farms, and as their wildness had been sacrificed, so were their chances for survival in the wild. In more recent years, however, biologists have determined that only truly wild turkeys can be stocked with any real chance for long term success. North Carolina's restocking program depends, therefore, on the trapping of wild birds from sanctuaries or other areas of abundance for immediate release on suitable sites where turkeys have disappeared — in some instances, long ago.

The two areas where I worked—Harmon Den and Green River—met the requirements for turkey restocking, both containing large tracts of suitable habitat which once supported wild turkeys. The Harmon Den section of Pisgah Game Lands is located just east of the Great Smoky Mountains National Park and is within the Pisgah National

PHOTO BY JOHN LONG

The wild turkey is, for the most part, a secretive bird, and most difficult to locate and study. Patience is an important virtue of the wildlife biologist. The turkey can be restored in time if we all cooperate.

Forest. The Green River Game Lands are located southeast of Hendersonville in Henderson and Polk counties. Twenty-seven turkeys were released at Harmon Den during August and September of 1971. At Green River, 23 were released during January and February of 1972.

I searched for turkeys in these areas mainly by walking old trails or logging roads, looking over forest clearings of all sorts or following streams and ridges. I used a "gobble box" turkey call some at first, but as the mating season was nearly over when I started, this technique was largely ineffective.

However, in an area where sign such as tracks, droppings and feathers can be easily found, it is not always necessary to actually see turkeys. This is fortunate, since the wild turkey is extremely wary and at the distant approach of humans can run away with surprising speed before being detected. Given this wariness and great mobility, it is no wonder that finding a small number of turkeys in a large area can be a difficult task.

A basic knowledge of where, when and how to look for them (or their sign) is absolutely necessary. My supervisor, Mr. Wayne Bailey, a nationally known turkey biologist, supplied a number of facts which made the job of searching much easier. For instance, one can often find hens with young broods in grassy forest clearings since these clearings supply the insects which form the main diet of the young. Close scrutiny and measurement of turkey tracks can serve to distinguish individuals as well as their sex. Feathers and droppings, often found around dusting places in summer, can both be used to determine sex and sometimes age.

Results of the investigations were both encouraging and frustrating. In the Harmon Den area, two broods, a total of nine young, were raised successfully very close to the release site. Yet, other birds or their sign were nearly impossible to locate. Reliable witnesses reported turkey sightings from widely scattered points, some nearly five miles distant.

In the Green River area, broods were hard to locate for counting, but unmated hen turkeys or their sign were easily and consistently found within a fairly small area near the release site. However, this area has a heavy woodland traffic of jeeps and trail bikes. It is quite possible that the excessive disturbance caused by these vehicles, if not poaching itself, has taken its toll of the year's reproductive effort. Otherwise, the differences in the two areas seem to be in the amount of spreading. This can probably be accounted for by the difference in release dates and the intervening stress of deer season.

An elaboration of the findings of a single investigation, though, is not really important. What is important is for every hunter and sportsman to realize that the wild turkey can make a dramatic recovery in many areas through proper restocking. But, the future success of the wild turkey restocking program will depend on two basic factors.

The first factor is habitat. Wild turkeys need large areas of relatively mature mast-producing forest. This forest land should preferably be punctuated by small clearings where young broods may obtain insects, and adults succulent vegetation during the spring and summer months. In fact, a lack of forest clearings isolated from frequent human disturbance can be a limiting factor to turkey populations.

Suitable habitat in large enough tracts is not common in North Carolina. Most large tracts are in the hands of timber companies or government agencies such as the U. S. Forest Service. For these areas to be suitable for restocking, forest management which is beneficial to wildlife must be practiced. All too often, though, forest management involves only the economical production of trees, and some management methods make large areas of forest unsuitable for turkeys. The culture of large, uninterrupted, even-aged stands of conifers and the converting of forest clearings to pine plantations are two forest management practices which hurt turkeys as well as other forms of wildlife.

The second factor in restocking success is protection. An official policy which always puts the right of the turkey to live, ahead of the right of the hunter to kill it, must prevail in the establishment of open seasons. This policy can now best be served by the spring "gobblers only" season, because this season does not lower the reproductive potential of turkey flocks as the fall "either sex" season can. Protection also, in the form of increased wildlife protector surveillance of turkey stocked areas is very helpful. Poaching is probably one of the greatest threats to an isolated group of turkeys, since the loss of a very few individuals could destroy the reproductive capacity of the group.

Finally, the mass public support of the hunting laws and the restocking program can spell the difference between success and failure of the wild turkey. Just as many small efforts were required to decimate the wild turkey in most of its former range, many small efforts can combine to help bring back this great American game bird. ▲▼

TROUT TACTICS

By Jim Dean
Photos by the Author

WHEN I first started fly fishing for trout, I had more time to read about it than anything else. In fact, I rarely had more than a few opportunities a year to actually fish.

It has taken me years to overcome this handicap because I believed everything I read about trout and I tried to put it all together on the trout stream. Somehow it never worked the way all the experts said it should.

Several things finally happened to lead me out of the mire of "book learning" to the comfortable high ground of practical experience. I owe my good friend A. J. Johnson most of the credit for this. He took one look at me and my array of tackle—I could have posed for an ad in Abercrombie and Fitch—and stated that I would never catch a wild brown trout in my home state of North Carolina. He was very nearly right.

About the same time, I realized that most of the books I had read were written about trout fishing in Europe, or the northeastern or western part of North America, and much of what is said in these books has little application in the southern Appalachians.

The result of all these things is that I have finally learned what most of you already know—that southern trout fishing is different.

Many of these differences must be learned through experience, but some can be explained. For one thing, the trout streams in North Carolina are not as rich as those found in many other parts of the world. On some streams in the northeast and west, I have been literally afraid to open my mouth during a hatch of mayflies, but I have seen very few such hatches in North Carolina. Occasionally in late April, May and early June, you see quite a few insects of considerable variety, but the hatches are usually small.

What this means is that North Carolina fly fishermen can—for the most part—forget about matching the hatch because most of the time the hatch is too small and consists of too many different kinds of insects.

Also, whereas the mayfly is the predominant aquatic insect in many streams outside the south, stoneflies and caddis are proportionately more abundant in our streams. Our trout are opportunists, taking what they can get when they can get it.

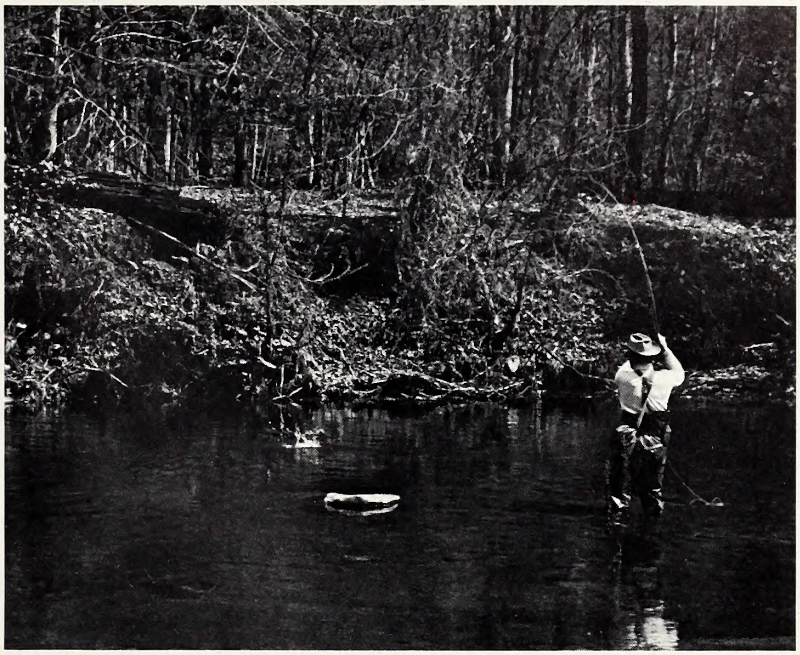
The fact that "matching the hatch" is not often important here does not mean our trout are easier to catch. Quite the contrary. Here's why. In many northern and western streams, the trout are not as wary as they are in the south because the streams are often larger than ours, and also because the trout tend to lose their natural wariness during the frequent heavy hatches of insects. I have fished streams in Pennsylvania, Wisconsin and Wyoming when you could have angled from the back of an elephant without scaring fish. But you often had to match the hatch exactly to catch fish.

In the south, the fly pattern is not usually important, but your approach to the fish is critical. In order to catch a wild southern trout, you must stalk him as carefully as a revenue officer sneaking up on a moonshine still.

These factors not only influence the angling techniques of southern fly fishermen, but they also influence tackle. Much has been written about the proper equipment for trout fishing, but not much has been said about the special characteristics of equipment to be used on small southern streams.

Perhaps it would be useful—particularly to novices—to suggest a suitable array of gear for the southern trout angler, keeping two things in mind. First, a fly fisherman can assemble a good working outfit for very little money if he shops wisely, and second, fly fishing is not nearly so hard to learn as many would have you believe. I know some eight-year-olds who catch trout on a fly rod and artificial flies.

The first consideration should be the proper rod. I may get some argument from this, but in my opinion, the most practical fly rod for trout is a seven-and-a-half to eight-foot rod. I know many good fishermen who use six- to seven-foot rods, but such short



Rarely will you see a trout of any magnitude this close before he sees you. Tackle and methods are important, but stream approach and presentation of the lure are keys to success. The angler at right has scored even though the light-colored shirt really violates one of the rules of caution in small stream trout fishing.

rods create more problems than they solve except on very small streams.

True, the short rod helps avoid tangles in the overhanging trees, but that is its only advantage. Besides, an experienced fisherman can use horizontal casts with a longer rod to avoid undue trouble even when the stream cover is thick.

Other advantages to longer rods are quickly evident to an experienced angler. Although most of your casts on southern streams are under 30 feet, there are plenty of pools where a long cast is necessary to reach pockets and runs that cannot be approached without scaring fish. A six- or seven-foot rod—in the hands of most fishermen—will not lay out a long cast with a big nymph or Wulff dry fly, whereas an eight-foot rod will. A longer rod also roll casts better. Also, with a short rod, you are always carrying loops of leader in your hand which snag on the brush. To me, the most important advantage of a long rod becomes apparent when you attempt to fish the tail of a pool while standing in the turbulent head of a pool just below. With a short rod, your line is caught in the current, creating drag on your fly in the quieter water of the tail of the pool. With an eight-foot rod, you can often hold your line above this turbulence.

One other point about rods. Don't buy a rod with a "fast" tip (that translates into limber tip) and stiff butt. Instead, buy a rod that has a more parabolic action extending well back into the handle. A suitable seven-and-a-half to eight-foot rod should normally use a five to seven weight line, with a six weight line being just about ideal.

If you're just starting out with limited funds, you can use a level line effectively, but later on you will certainly want to switch to either a double taper or weight-forward line. I personally prefer weight forward, but the double taper is probably more popular.

Your choice of leaders is important. Although many authorities in books refer to leaders ranging from 10 to 18 feet long, you will find this much too long for most of North Carolina's streams. The most commonly used leader length in southern streams is probably nine feet, but I sometimes use a leader only seven feet long, particularly when fishing a big nymph or using two flies (one a dry and the other a nymph on a dropper). The butt section of the leader should be stiff (25-30 pound test) tapering down to a 20-inch tippet. The tippet is usually 3X or 4X which means it tests about six pounds or four pounds depending upon who makes it. A 4X tippet is probably your best bet for general fishing. Commercial tapered leaders are not expensive, and they work well.

There isn't much point in spending a lot of time talking about reels. Most anglers use a good single action reel with a dependable drag that can be set for a very light pull in case you hang a big trout. It is safer to play a big trout directly from the reel rather than by holding the line in the hand. Although you can pay $40 or more for a fancy English reel, there are good reels available for as little as $8 to $12.

I confess to being a fly freak, and when I go fishing, I carry a lot of flies. One reason is because I tie my own, but I don't really need so many different patterns because 90 percent of the time trout can be caught using only a few.

The most popular full season dry fly in North Carolina is undoubtedly a size 12 Wulff Royal, and some fishermen use nothing else. The Gray Wulff is a good early season dry fly, while the Blonde Wulff is better from late spring through the season. The Female Adams in sizes 12 and 14 is another favorite, and you may also want a few Quill Gordons, Hendricksons and Light Cahills.

• **continued on page 27**

Natural Areas

Natural areas are fast disappearing, victims of development, highways, etc. Are they worth saving?

By David M. DuMond
Wilmington
Photos by the Author

THE old logging road narrowed to a path criss-crossed with a tangle of last year's blackberry briers. It was too early to see new shoots. A wintry chill still lingered in the air. Scattered young pines and low weeds brushed my pants' legs and shoulders as I made my way along the faint trail. I decided the last passer-by must have been a raccoon, maybe last fall. A few lespedeza and horseweed stems crunched moistly under my boots as the way became more of a tangle and less of a trail.

It was obvious this was once a field. The furrows were plain to see. The last field of a decaying farm —finally abandoned. Goodness only knows why. The pines must be ten or fifteen years old now. It had probably been that long since anyone but hunters had passed this way.

A small covey of quail burst up before me and I went through the usual ten seconds of extra-rapid heart rate. My eyes followed one of the birds as it flew to the edge of the forest toward which I had been working my way. A few more steps would get me there.

Upon entering the forest margin I paused for a good look around. This was the beginning of what I had come to see.

The scene was one that took me by surprise. The sharp line between forest and old field. A steep slope downward and the ripple of yet unseen water. A forest of trees, most of which must have been taking their shares of water and sun for better than a hundred years. Some of the trunks were squeezed and bent where tumbled boulders had forced a change in the direction of growth. The winter greens, grays, and browns almost swallowed up the scattered patches of light green.

Light green! I swallowed hard and almost leaped down the leaf and loam-covered slope. Dutchman's britches, toothwort trout lily, giant chick-weed, and wind flower were not only up, but blooming.

In an uncontrolled state of delight, I opened my mouth and dropped the words, "Natural area."

By the time I had finished an hour of reconnaissance, I was sure I had found an area of not only gentle beauty but of scientific value as well. A large stream had been working here for the past several millions of years—performing the task that is the lot of many streams, cutting out a bed. West and east of this miniature heaven, low flood plain bore the more customary plants for near-stream margins. But the walls of a ravine sloped suddenly upward from the stream bed as it bent sharply to the north, performing a loop that brought it back to its original heading. The north-facing slope that rose from the loop was a harder, less easily eroded piece of landscape that had more nearly shunned the natural processes of weathering and erosion.

Some of the boulders had loosened and moved downward for a way, giving mute evidence that nature was still persisting.

The rocks had a reddish hue and a slightly grainy texture. Triassic sandstone, I guessed. That meant that these rocks were formed at the bottom of a small inland sea at least 180 million years ago. That was before the Age of Dinosaurs.

Some of the plants now growing on these slopes were very unusual for this geographic area. There was more to geology and soil here than first met the eye. During the close of the Triassic Period there had been a relatively brief but quite restless shifting of the earth's crust. Along with faulting and slipping, there had been a period when rock, under tremendous pressure, was squeezed into some of the newly created cracks and crevices. This took place very far below what was then the surface of this area. Piled high above the present rocks

Areas which must be considered for complete preservation include natural granite outcrops, like those shown on the opposite page, and many flood plain forests such as this one along the Haw River.

Natural areas contain many living things worthy of protection, like wildflowers represented here by Dutchman's Britches. The areas in question may be the last such refuges for several species of plants and animals.

and soils were hundreds of feet of material, long since removed by erosion.

Somewhere beneath this soil and between these reddish rocks before me were one or many cracks, still holding that material long ago squeezed into place—material called diabase squeezed into a dike. This and probably multitudes of other streams had ultimately raced and meandered across the landscape that is now washed eastward to floor the Atlantic Ocean or to feed a wandering sand dune. Slow wearing aided by water, winter's cold, and plants' roots have carved the present lay of the land, bringing into the soil circulation some unusual chemical characteristics contained in the diabase dike. This was strongly supported by such an unusual collection of plants.

A story as told by nature was here for the reading. The swelling and receding landscape was momentarily locked in a flowered limbo between the past and the most uncertain future.

The above area is in the Piedmont Province of North Carolina. It represents a natural phenomenon that is fairly typical, though rare in this portion of the state. Diabase dikes are not common and are rarely so clearly indicated by a rich growth of rare plants.

Many other kinds of natural areas are scattered throughout the Piedmont. Some are deserts of granite. Some are flood plain forests paralleling major streams. Some are small packets of rich beech woods tucked away in steep ravines. Some are bluffs covered with a slick of rhododendron, very rare outside of the mountains. One even contains Canadian hemlock, nearly 200 miles from the mountains where it is abundant.

Mountains and Coastal Plain have their own unique complements of natural areas. The variation in kind is just as great or greater than for the Piedmont. In the mountains, natural grassy meadows. In the Coastal Plain, pine, savannah land. In all the provinces the marsh, the swamp, or the bog —differing in character depending on the location. In the mountains, the deep cove forest. In the Coastal Plain, the increasingly rare maritime forest, pocosins and fragile sand sink ponds.

It may seem absurd, but not all natural areas are "natural" in the traditional sense of the word. Upon occasion, the activities of man have not resulted in sheer disaster. One such type of area is the mill pond or lake. Some of these visible memories from an age, perhaps more gentle than ours, have blended with time and local ecology and now present habitats of true uniqueness.

Wherever nature has largely escaped man's trying hand, or healed, in some unique way, the wounds he has inflicted, a natural area may exist. There are all kinds, and they can be found almost anywhere.

In 1963 the North Carolina Division of State Parks instituted a Natural Areas Program. Weymouth Woods Nature Preserve in the Sandhills region of North Carolina became the first of its kind for the state.

Since 1971, Dr. Robert Teulings with the Division of State Parks has been collecting information and cataloguing all natural areas brought to his attention. Some 300 areas are presently catalogued in his files. Doubtless, hundreds more exist, yet undiscovered.

One of the real problems Dr. Teulings faces is making objective decisions about what constitutes a natural area. There is no basic definition to guide him. Each area must be visited and evaluated as a separate situation. To the present, there has been neither time nor support to accomplish the task. About a hundred areas have been visited and only thirty-five or forty have received the detailed attention necessary to allow decisions about their value. Even with the help of two active field men during the summer, the task will be years in completion.

To help, the Division of State Parks supported investigations by thirteen colleges and universities during the 1971-72 school year. The information

Some natural areas in our State have the added attraction of recreational waterways. Rafting and canoeing are favorite sports along portions of the Eno, shown here. Once destroyed, these areas may be gone forever.

gathered during this period provided grist for future interpretive programs in natural areas throughout the State.

Most recently, a Natural Areas Advisory Committee made up of seven persons, four biologists and three non-scientists, have been appointed to aid in evaluation, selection, and interpretation of top priority areas.

Some of the other problems faced by the Natural Areas Program are lack of general public understanding or appreciation, lack of funds, lack of personnel, and preservation in the face of increasing numbers of housing developments, shopping centers, and highways.

Natural areas are not a new concept. For as many as fifteen years programs to locate and preserve unique natural habitats have been underway. in several states. In as many as twenty-one states, natural areas programs are on-going. Some states such as California, Georgia, Illinois, Indiana, Ohio, Texas, Vermont, and Wisconsin have existing systems of unique lands preserved for the aesthetic and scientific enjoyment of its citizens.

These areas are not parks in the commonly accepted sense of the word. They are preserves that present a completely different set of conditions for maintenance and operation and use. Some are such tiny, such fragile bits of natural landscape that a foot in the wrong place can contribute a significant amount of ruin. Some have an extensive system of trails that guide any visitor through a unique natural experience. Some are such key points to the total understanding of the earth that they are reserved only for scientific investigation. Some, like our Weymouth Woods, preserve and go to great lengths to interpret the natural aspects of a vanishing landscape. All are vital parts of our understanding of nature.

The natural area does not present the visitor with a multitude of recreational devices. Kiddie swings, picnic tables, and pleasure boating or swimming are not to be expected. These are reserved for parks and recreational areas. The natural area is for people seriously interested in discovering how nature operates without "benefit" of modern conveniences. They are, in a sense, miniature wilderness areas where a man can delight in using his senses to discover what nature is really like.

North Carolina is a fantastically varied state. It probably has thousands of potential natural areas. Now, that is. In time, these hidden landscapes will dissolve under a flood of "environmentally sound developments." The landscape of North Carolina is presently as free of asphalt and concrete as any state east of the Mississippi River. Other states, even those with the best developed natural areas programs, have a very limited amount of landscape to consider. The advantage is to be realized now, not ten years hence.

With public support, the North Carolina Natural Areas Program can grow and some of the valuable habitats of the State can be preserved for generations of North Carolinians yet to come, as well as for plants and animals that also require food and shelter.

Do you know a place where spring flowers abound, where rocks mark a precipitous plunge to a river, where strange birds collect in unusual numbers, where unusual things grow from a sodden bog? Do you know of a natural area from which others can benefit? If so, and if you feel you can make it known, you may write to Dr. Robert Teulings, North Carolina Natural Areas Inventory, Division of State Parks, Administration Building, Raleigh, North Carolina, 27611 and request a Natural Area Survey Form. Return of the completed form will be a valuable investment in the natural environment of your state. ⬍

Stem to Stern

BY ED JENKINS

SPRING is here and, for you boaters, here's a review of boating's basic safety rules from the Johnson Motors News Bureau.

Suppose you're on your favorite lake and you suddenly see a boat ahead and to the right of you. As you continue, you realize that you're on a collision course. What should you do? You should make sure that there isn't a collision, because the other boat has the right of way. If he is ahead and to the right, he's in your danger zone, so it's your job to avoid the collision. He should remain on course and maintain speed, while you slow down or steer around him.

If you're backing up, the stern of the boat becomes the bow when determining the danger zone. Ahead and to the right really depends on which way you're going.

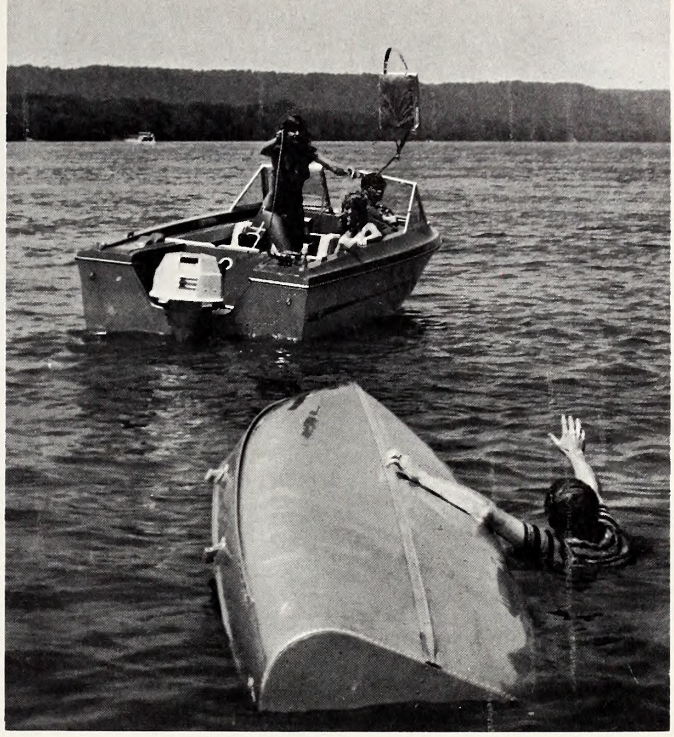
There's an old boating adage that power gives way to sail and that large gives way to small. This generally holds true. If you're out in your outboard rig, and there's a sailboat near, it's your job to avoid the sail, and you've got to be careful with your wake, too. Rowboats also have the right of way.

But don't carry this to extremes. If you're in your outboard rig, and a freighter is steaming down on you, don't expect him to give way. You're much more maneuverable than he is and should move out of his way.

If you see a boat heading right towards you so that there's danger of a head-on collision, it's up to both of you to change course to avoid the collision, and it's best to steer to the right, so that the boats pass port-to-port.

When you're passing a slower boat, should you pass on the right or left? It really doesn't matter, but the boat being passed has the right-of-way, so be sure to keep well away and watch your wake. You're responsible for your wake and any damage it does. Again, the boat being passed should maintain its speed and course.

Be equally careful around fishermen. You want to make sure that you don't upset their boat, or that your prop and their lines don't become close friends. Monofilament line isn't easy to unwind from a prop shaft.



EVINRUDE MOTORS PHOTOS

Accidents don't give warning. Preparation before they happen is often the key to survival. Any floatable object with a line attached, properly placed within the victim's reach, will help (above). Personal flotation devices like the one shown below, make good sense, particularly for non-swimmers and youngsters. One must be available for each passenger.

With the popularity of trailering, many boaters are spending their time on new and unfamiliar waters, so the boater has to keep his eyes peeled for any obstacles sticking out of the water, and look out for any signs of underwater objects.

If the water is very calm and much lighter in one area, it is a sign of shallow water. The deeper the water, the darker the color. A break in the current, eddies, or turbulent water may mean there are submerged logs or rocks.

Of course, any boat must be equipped with the required safety items: like life preservers for every passenger, fire extinguisher, proper lights, whistle or horn. No boater would want to be without an anchor, compass, extra line, tool kit, and a paddle or other form of auxiliary power. Flashlight, spare can of gas, and bilge pump are things that hopefully won't ever be needed, but are indispensable when they are.

Know your equipment and how to use it. Make your boating days safe as well as fun. ◆

IT FLOATS!

by Paul Jennewein
Wrightsville Beach

IT was a glorious occasion, much as W. John Craig of Wilmington halfway predicted for the launching of his ferro-cement boat at the Masonboro Boat Yard near the inland waterway.

About 500 people—from Bump Styron of Morehead City to J. Toms Dover of Charlotte—came down especially for the event.

The floating docks beside the marine railway were virtually awash with well-wishers. Some were hanging on the nearby docked craft so that they wouldn't slip into the water.

Boats crowded with other spectators made an arc around the railway dock.

The ceremonial champagne bottle hung from the bow. At 1830 nautical time on 6 August 1972, the bottle was swung in an arc against the stem of the 50-footer. At the same time, the lanyard on a signal cannon beside the railway was jerked, so that even 500 feet away—and up the waterway—the audience could hear the report.

In the shed where the boat had been abuilding for the past 18 or so months—the keel was welded together by L. T. (Leaky) Davis, Jr. in January 1970 (WILDLIFE IN NORTH CAROLINA, February 1972)—the railway winch was put in reverse and started squeaking to lower the boat into the water.

Capt. Craig had selected a higher than normal high tide to launch his craft to be sure there would be plenty of water for total immersion. Davis and Capt. Craig checked the progress of the big boat as she slid down the ways, appearing to shrink in size as she descended into the water and put distance between her and the shed. She slid stern-to into the creek.

G. Ed Lowe, Jr., owner of the yard, directed efforts to free the props from beneath the smooth-surfaced hull, so that she would float free once she reached the water.

Halfway down, Capt. Craig yelled to the shore crew to get some lines. Forgotten had been the ropes to be used to moor the boat once she floated. Two coils were thrown to Craig and Davis in the bow.

About 1843 nautical time, the signal cannon again fired to signify the ferro-cement craft had reached the limit of the railway cradle's immersion.

"Paul Jennewein," Capt. Craig yelled, after checking the waterline from the side of the boat.

Jennewein raised his hand from a point near the railway.

"Look closely," Craig said. "She's floating."

The tons of chicken wire and hardware cloth, the bags of special cement and fine, dust-like sand, ordinarily would have sunk. But in this particular shape, remained buoyant. In fact the waterline was exposed above the water about an inch.

Capt. Craig, who moored the boat to a piling and then reached land by way of a rowboat, said the boat isn't complete. While the aluminum superstructure is in place, as well as the twin 320-hp diesels, none of the interior accommodations has been installed.

"We're going to have wall-to-wall carpeting and air conditioning," he said. "It'll take about a year to complete."

The addition of the interior appointments, insulation, cabinet work, special fishing gear and containers for icing down the catches, is expected to put the waterline right at the waterline.

Craig explained the boat might be used for a fishing trip before completion.

"We plan to fire up the engines in a couple of weeks," he said. "Then we'll give her a short run to check her in the ocean. We might even take her out on a fishing trip in a stripped-down version."

There was champagne, too.

Every time a cork popped, the signal cannon was fired.

In his earlier invitation, Capt. Craig had asked folks to come to "what may or may not be a glorious occasion." It was that and memorable.

And the boat definitely floats. ◆

Instructors Go To School

Photo Feature by Ed Jenkins

Providing training designed to qualify instructors in small boat handling has long been the goal of the American National Red Cross through its National Aquatic Schools. The school this year is to be held at Camp Ocala near Umatilla, Florida. Persons interested in the small craft school June 10 to 20 should write the American National Red Cross, 1955 Monroe Drive, N.E., Atlanta, Ga. 30324..

Last year's Small Craft School was held at Camp Chimney Rock on Lake Lure. After graduation, the participants are qualified to teach sailing, canoeing, or outboard boating. Student instructors learn by doing under the watchful eyes of experts in their fields. The fee for the 10-day course is $80, and includes room, board, and study aids.

Artificial Reefs

By Rob Reedy
Morehead City

PHOTO BY ROB REEDY

THE idea of creating habitats for fish is not new. The Japanese have been using man-made reefs of different types for hundreds of years. Efforts toward establishing artificial reefs in the United States have been comparatively recent, but North Carolina already has a good start on four saltwater fish havens.

The purpose of an artificial reef is to attract fish into an area that is devoid of any resident species. This means providing them with two things: shelter and food. A flat, barren ocean bottom, like that found off most of our coast, offers neither. Placing objects such as wrecked ships, old automobiles or piles of rocks on the bottom provides a place for a marine community to establish itself. Artificial reef construction is simply a matter of creating at least cost a structure which provides 1) the greatest number of hiding places for the fish and (2) the greatest amount of surface area on which marine organisms can grow. The idea is to attract small fish; the larger ones will naturally follow.

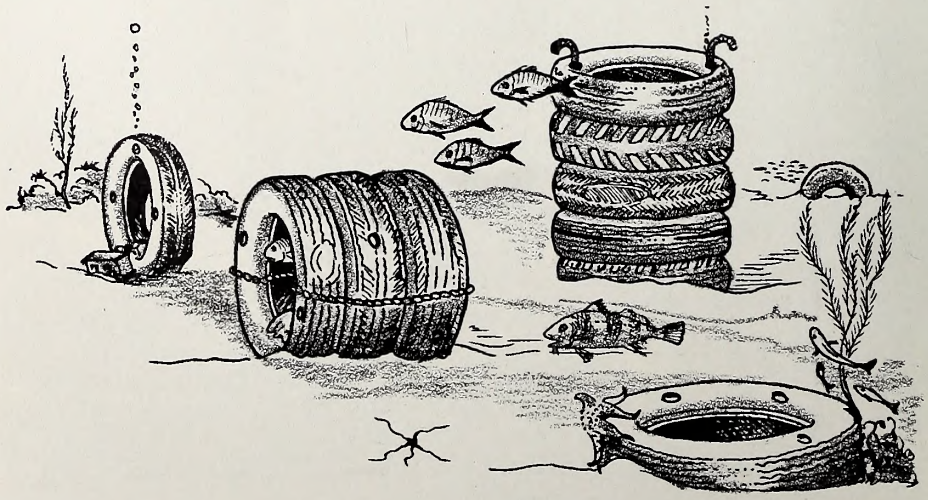
Dick Stone, chief of the Artificial Reef program at the National Oceanic and Atmospheric Administration's Atlantic Estuarine Fisheries Center at Beaufort has been involved in reef construction since 1966. In that time he has used junked cars, old boats, building rubble, precast concrete "fish apartment houses", concrete culvert and discarded automobile tires as reef material. Junked automobiles, Mr. Stone found, last only about five years in salt water and are very expensive to handle (about $80 per unit). In addition they disintegrate readily in rough weather and tend to litter beaches with rusty debris. Concrete materials make an excellent base for a reef, but they too are very heavy and expensive to handle. Old boats are fine when they are available but they require towing, usually by a fairly large vessel.

The greatest success, after taking into account cost, manageability and ease of transportation, was achieved with the old tires. They are free, can be handled easily without heavy equipment, and according to Mr. Stone can be arranged in a variety of ways to suit different purposes. They also have a very long underwater life and provide excellent surfaces for marine growth.

The most convenient arrangements of tires are those shown in the accompanying sketch. The single tire unit (#1) is just a tire casing weighted at the bottom with an air escape hole drilled or punched at the top. It can be carried in a small boat and dropped overboard at the reef site. The three tire unit (#2) is three of the single units tied or bolted together. It lies on its side and creates a small underwater cave. It too can be carried aboard small craft. The third unit (#3) is a stack of up to eight tires with the bottom one poured full of concrete and the pile held together with lengths of rough reinforcing rod. The unit weighs about 250 pounds, but can be turned on its side and rolled easily by one man. When sunk it stands upright and

Tires can be used in any of several arrangements. Shown here are three basic units, the single tire weighted with concrete block, a group of three, partially filled with concrete, and a unit of six or more fastened together and weighted with concrete.

ILLUSTRATION BY REX SCHMIDT



gives profile (height above the bottom) to the reef. Profile is necessary to attract pelagics such as mackerel and bluefish. All the units sink slightly into a sandy bottom and need no additional anchoring. In addition to providing shelter, these units attract crabs, sea urchins and the other small marine creatures that provide food for larger organisms.

North Carolina's present saltwater artificial reefs are located at Atlantic Beach, Wrightsville Beach, Carolina Beach and Lockwood's Folly Inlet. The Lockwood's Folly reef is the only one made up entirely of old tires. Constructed by members of the Brunswick County Fishing Club, it is buoyed in 48 feet of water 4.5 miles off the Inlet. To date there are more than 3,000 tires on the reef and fish catches have increased dramatically since it was put in.

Two of the reefs contain sunken vessels: an old tugboat lies 1.5 miles off Carolina Beach in about 40 feet of water, and another boat was sunk about three miles off Wrightsville Beach. The New Hanover County Fishing Club and county commissioners worked with Dick Stone on the technical aspects of putting these two reefs in, and the N. C. Fisheries Commission's research vessel DAN MOORE towed the boats out and sank them. Both reefs were buoyed at that time, but the Carolina Beach buoy has been lost and not yet replaced.

The Wrightsville reef lies on a compass bearing of about 100° from Masonboro Inlet, about halfway between Mason Inlet and the first watertower to the south. A white styrofoam marker floats about 150 feet due west of the reef. In addition to the old hulk it contains some 200 old tires and a washing machine, all dropped by local fishermen and divers. The reef has about a 15-foot profile and is sitting on an old coral bed in 50 feet of water. The last inspection, on October 31, 1972, brought reports of amberjack in the 80 pound class, flounder to about five pounds, sheepshead to seven pounds and so many bass, grunt and porgies that it was impossible to count them. Many non-game species and reef-dwelling creatures were also noted.

The Atlantic Beach reef consists of about 800 tons of concrete rubble and 1500 tires dumped on the site of an older reef begun by the Fabulous Fishing Club of Morehead City in 1964. Without donations of equipment and personnel it would have been impossible to move the large chunks of concrete to the site. Several businesses, the U.S. Marine Corps, the U. S. Army Reserve and local governments provided the necessary items cost free and the Coast Guard Cutter VERBENA put a buoy on the site. The Carteret County commissioners' Reef Committee, headed by Pete Parker of Morehead City, coordinated and directed the project.

Divers investigated the reef in June and September of 1972, seven and ten months after it was put in. They found most of the concrete blocks strung out south-southwest of the buoy, spaced twenty to forty feet apart. A good growth of encrusting organisms, sea squirts and sponges was reported. Included in the thirteen species of fish seen were amberjack, sheepshead, sea bass, porgies, flounder and tautog. The only shortcoming in the structure is the large distance between blocks. To give the reef continuity these must be filled in with either tires or more rubble. Even so, good catches of fish have been reported. All four of the reefs have had increasing takes of everything from flounder to bluefish since they were built.

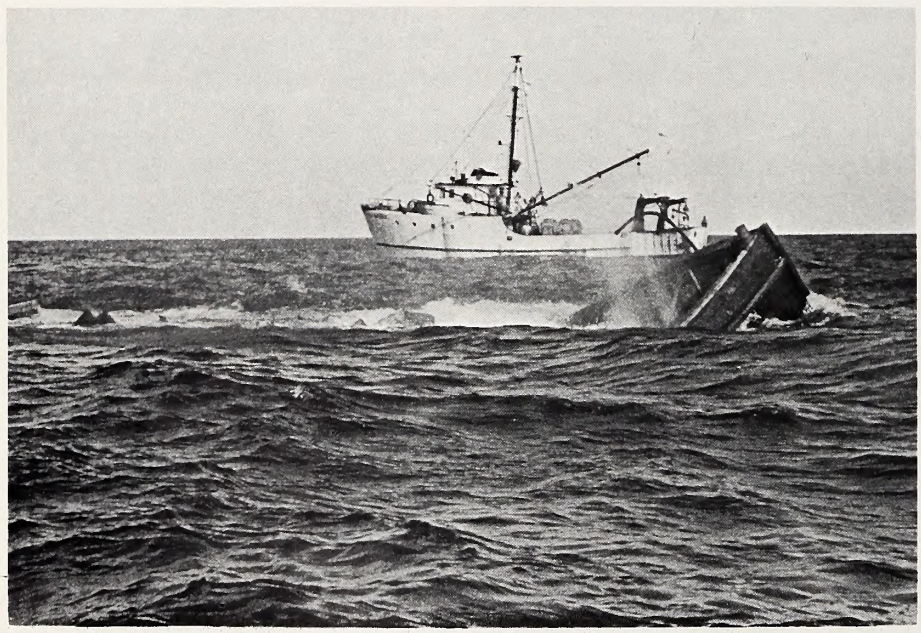
North Carolina has no state program for artificial reef construction, and the reefs that have been built so far are mainly the result of work by the Federal government, local governments and private organizations. Up until the present time, no state funds have been available for construction of reefs off our coast. It is possible that at some future time, money can be secured for building of artificial reef structures in otherwise barren areas. The aim of such a program would be to eventually establish a system of reefs that would be a useful economic resource from both sport and commercial fishing standpoints.

The work that is being done in North Carolina is dependent entirely on volunteers, and more are needed. If your sporting club, environmental group, service organization or you as an individual would like to help, people are needed to assemble and prepare materials, transport them to the reef sites and assist in mapping the reefs. For information on

PHOTO BY ROB REEDY

Marine growths of many kinds soon cover the tire "reefs", and bottom-roaming fish like these grunts come for food and shelter. This jumble of old tires is off Wrightsville Beach.

PHOTOS BY JIM TYLER



The tug FIREFIGHTER goes down to become part of a reef at Wrightsville Beach. The research vessel DAN MOORE is in the background. Sunken ships of all kinds work well as artificial reefs, but are expensive to obtain and tow to the site. Only a few months after being sunk, the old tug (below) is the new home for hundreds of tomtates and porgies. Good fishing should result from the concentrations.

how you can help, and available literature, contact:

Mr. Richard B. Stone
National Oceanic and Atmospheric Administration
National Marine Fisheries Service
Atlantic Estuarine Fisheries Center
Beaufort, North Carolina 28516

OR: Mr. Jim Tyler or Mr. Willard Lane
Artificial Reef Coordinators
N. C. Fisheries Commission
P.O. Box 769
Morehead City, North Carolina 28577

With a little effort both sport and commercial fishing interests stand to prosper as greatly in North Carolina as they have in other states.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Spring Gobbler Season Set for April 21

The only major hunting season left is for wild turkeys with the dates set from April 21 to May 12. Limits are one gobbler per day, 2 in possession, and two for the season. No dogs are allowed for spring turkey hunting for the obvious reason they would be a hazard to female turkeys already on the nest.

Courtesy Motorboat Examinations Scheduled

The U. S. Coast Guard Auxiliary has announced the following courtesy boat inspections to make sure that boats are properly equipped and numbered for the upcoming boating season:

April 13-14-15, 12 noon until 6 p.m. at Trotter's Sport Marina, Thomasville.
April 29 and May 13, 12 noon until 3 p.m. at the boat ramps on Lake Wheeler, south of Raleigh.
May 12-13, 12 noon until 6 p.m., Oak Hollow Lake, High Point.
May 19, 10 a.m. until 2 p.m., Lake Wheeler.
May 20, 12 noon until 2 p.m., Lake Wheeler.

Wildlife Quiz Contest Results to be Announced

A total of 136 readers of Wildlife entered the quiz contest last December, and work has finally been completed in grading the exams. Winners will be announced in the May issue. Contest Judges, however, are still puzzling over how to select the top award winners from 23 perfect scores. Some contestants may call for a run-off!

Mountain Trout Season Opened March 31

To give trout anglers a full opening day weekend of fishing, the Wildlife Commission moved opening date from April 1 to March 31. April is the biggest trout fishing month of the year, with most of the fishing pressure occurring during the first few days of fishing. Pre-season stocking had been completed by the time the season opened; in-season stocking will continue.

Calling For Clean-up

By Peggy Payne
Raleigh

A woman piloting a plane over Hyco Lake at 4,000 feet entered a cloud of smoke that blotted out the horizon.

Below her she had seen a factory with two smoke stacks.

When she landed she made a phone call.

The number was 1-800-662-7308, the Pollution Help Line in the state Office of Water and Air Resources.

She was one of 1,059 that have dialed the number and reported evidence of pollution since the start of this program.

Since October of 1971, the line has been—intermittently—busy. The callers have complained of air and water pollution, offensive odors, noise pollution. The calls have come from all parts of the state.

Called-in complaints are referred to the appropriate agency for investigation.

Reports are made, with copies going to the caller and the party complained about. Action is taken when it is warranted and the caller is advised of this, according to Mrs. Jackie Wall, who sits at the answering end of the line.

There is a stack about three inches deep of complaints with investigations incomplete and reports still pending. There is a file drawer of complaints with completed reports.

The "pending" pile has calls that date back to the early months of the line's existence. "What we have to do with limited staff is take the ones that seem to be the most significant," explained Darwin Coburn, chief of water quality control.

The help line appears to be a better tool for involving public participation and creating good will than it does for actually pinpointing unidentified sources of pollution.

In both water and air pollution categories, state officials say that the majority of the reports concern pollution sources that are already known.

"But there have been instances where there were problems we did not have information on," said Everett Knight, head of the air quality control division. "In the future as more and more of these sources come into compliance, the line has an excellent potential for expanding our monitoring capabilities." The whole state can watch for violations, he explained.

The system is particularly valuable in involving and educating the public about the pollution abatement program, Knight said.

"A person calls and makes known the conditions they are concerned about. As part of the investigation we have a chance to sit down and talk with that person. Through this kind of contact, we can generate better understanding of what the program is all about."

The line was set up a year and a half ago, because "we felt like the citizens of this state in every remote area should have an immediate knowledge of how to report any pollution they witness," explained Vic Barfield, assistant secretary of the Department of Natural and Economic Resources.

It seemed a better and more productive alternative to "letter-writing campaigns or the bureaucracy of regular telephone systems."

"We needed to get identification of these problems and to assure the citizens that something was going to be done about them."

"It has presented problems," he added. "It has required a good deal of time to chase down each call."

The idea was not initially met with open arms by all of the state's pollution abatement staff. "We had reservations about it at first because of the initial work for the staff," said Coburn. "Most of us have changed our minds."

A random flipping through the reports of complaints shows a great variety.

One person lives across from the railroad tracks in Mount Olive. The unloading of lime and salt are creating an air pollution problem. And the hammering on salt to break it up is persistently annoying, the caller said.

A neighbor is emptying his washwater into a branch of Muddy Creek, says another.

A family lives down the street from 40,000 chickens and they don't like the smell. They're having to sleep with all the windows and doors closed and the smell aggravates the three year-old's allergies, the report said.

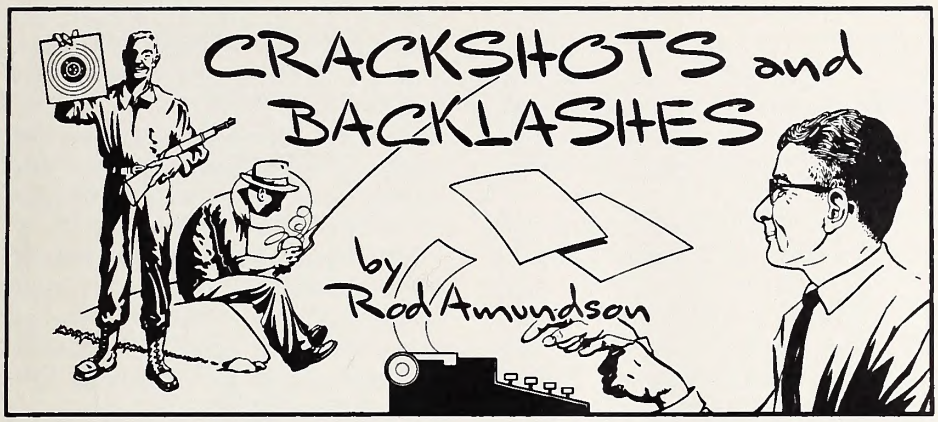
One person noted the license plates of two trucks "emitting smoke and fumes" on the highway.

Another call reported that trash was flying out of the incinerator of a nearby industrial plant. The investigation report said that the company was putting a new screen on the incinerator and would adhere to an abatement schedule that would stop all burning by February 1, 1973.

Another complainant didn't get such satisfaction. The caller didn't like the smell from an egg producer's yard. After investigation of the site and its precautions the report concluded that "the complaint was the result of a personal matter."

The possibility for some means of improving the system is always open to consideration, Barfield said. One of these alternatives is to set up help lines on a regional basis, with perhaps one in the east and one in the west.

Another possibility is that with complete control of pollution it wouldn't be needed, he added. "If we're doing our job, ideally in the next few years, it wouldn't be needed." ◆



"Hey — that's My Fish"

Gentlemen:

Your article "What About the Striped Bass" in the December 1972 issue on the stocking of stripers in our North Carolina lakes was very impressive and brought to mind the following:

On Saturday morning, November 11, 1972 my husband and I left home headed for Kerr Reservoir, he, most expectantly and I, most dejectedly. I enjoy getting out and trying to catch fish; but the house was a mess and I had fished as hard as anybody ever has trying to catch THE fish. Unlike David, my husband, my best efforts thus far had been a 4-pound largemouth after eight years of fishing.

The day was beautiful and the drive very pleasant; we had everything packed for an overnight stay in our truck-camper. We arrived at the lake around noon and were well down the lake by one.

David had fixed our rigs for trolling for striped bass. He let me use a white Waterdog to which I attached a grey plastic skirt his father had given me, making it much prettier. He was using a redheaded Bomber which looked to me like its eyes were in the wrong place. He put the rods in the holders at the back of the boat, tying them with line so the "big ones" wouldn't pull the rods into the lake when they hit. I thought "oh joy". This was the second time at this, and the first time we took home a one-pound catfish. So I thought I would just relax and enjoy being outdoors. The weather was warm with a little breeze and every once in a while the water would be smooth as glass. It was a little muddy though.

David took the boat past Goat Island, out about 100 yards, and my rod bent like that Waterdog had stopped dead. I jumped for the rod; gave a jerk, almost hit David in the head, and knew I was hung up. David just kept on going and hollered "are you hung?" I gave a couple of winds and said "Yes, I think so" but he still didn't stop the boat. I was winding and the line was going out, so I just stopped and gave him a look I know he loved and shouted "will you please stop this boat and let me get un-hung?" He did.

I wound and wound and all the while I was at it the line tied to the rod kept getting under my feet and I thought, what if I fall out all tangled up! We will never do that again! I was getting tired of winding and it was showing. David said let him have the rod and he would get it in for me. I told him I thought I was pulling in a stump or something but wondered how can I be as we were in 45 feet of water. Well, he took the rod, cut off the line which attached it to the boat. He must have wound 8 or 9 times and as I was watching him and the rod it dawned on me—that's a fish, MY fish! I started yelling "Give me my rod! Give it to me!" He looked at me like I was crazy but gave me the rod. I started winding for all I was worth; after about five minutes David said I was not bringing in any line.

About that time the line went "zing - a - zing - a - zing." I started laughing and hollering "I got a fish, I got me a big fish!" I was fighting the fish and David was trying to set my drag and I was getting tired.

Talk about a fight. When I finally got him close to the boat he decided he really didn't like the look of things and it was on again for a while.

When my husband boated him with a net, all I could do was look at that beautiful striped creature. 9½ pounds, 29" long and there was no way I could contain myself; running my mouth and laughing.

When I finally calmed down we trolled through the same spot and David hung one. I took over driving the boat and did not pull his fish. He had one heck of a time getting it to the boat; me telling him just how to do it all the while. Well, his fish put up a better fight than mine and I was to do the netting. Too anxious, I guess, I got that fish across the net; he gave a flip and back to the deep he went, a whole lot smarter I expect, leaving David with a straightened out hook. He just sat down and didn't say anything. I started crying. It was getting dark and we had to go in, we didn't know the lake too well. I said a little prayer. "Please God, tomorrow just one fish for David." I knew I had to do something or I would be sitting at home from then on.

The next day found us at the same spot about the same time. David got his strike. There is no way to describe the way that fish fought. Anytime he got ready to go he took all the line he wanted. We had to pull it all over the lake with the boat before he slowed down enough for David to get him to the boat—and he was still full of fight. Finally, when time came to net him, I looked at David and he looked at me and shook his head up and down and I set my teeth, determined that this fish was as good as in the boat. I got him in the net—head first—but was so excited I couldn't pick him up. David grabbed for the net. He weighed 14¼ pounds; 33" long. We straightened around and back we went again. David's rod bent double and it was on. This time it was a 15 pounder. You talk about some kind of happiness in a boat! Our second time after rockfish. We just couldn't believe it.

I wanted to have his 15 pounder mounted but David wouldn't hear of it. He says there's rock in that lake twice as big and he is going to catch some.

You better believe I've been read-

KNOW YOUR PROTECTOR

Laurie M. Bradshaw

Wildlife Protector Laurie M. Bradshaw, stationed at Lincolnton in Lincoln County, was born July 29, 1941, in Carteret County. He is the son of Mr. and Mrs. Willie G. Bradshaw of Harlowe, North Carolina. Laurie graduated from Newport High School in Carteret County.

Prior to employment with the North Carolina Wildlife Resources Commission, he served with the U.S. Air Force. After his discharge from the service, he was employed with Conner Mobile Homes in Newport, North Carolina.

Mr. Bradshaw completed the basic school for wildlife protectors at the Institute of Government at Chapel Hill in June of 1964. He was employed as Wildlife Protector Trainee in December of 1965 and stationed at Greenville. In March of 1966, he was appointed Wildlife Protector and transferred to Kinston. In November of 1968, he was transferred to Lincolnton. Since his initial employment, he has attended four In-Service Training Schools.

Mr. Bradshaw is a member of the Southeastern Game and Fish Commissioners, Law Enforcement Section, and the North Carolina Law Enforcement Officers Association.

Laurie is married to the former Pearl Davis of Springfield, Massachusetts, and they have two children, Suzanne Dawn, age 7, and Laurie Michael, age 4.

The Bradshaw family attend the Church of Christ of Lincolnton.

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ing everything about fishing in "Wildlife" and waiting for the next time David takes me fishing. I'm ready for 'em.

by Mrs. Sylvia B. Smith
Brown Summit

Some sport fishermen have really been the "bad" guys recently, and have been in the past. We would like your help in reporting them. Some of us are getting more than aggravated with people stealing flounder from our nets, and if we catch one of them, he will surely be in for a rough time. We would like, however, for the law to catch them.

Each fall we put out our nets to catch flounder. We make our living from fish. The nets start on or near shore and stretch out into deeper water. The net is supported by poles. Many of us have more than $5,000 invested in a rig.

People who steal flounder from our nets many times tear up the net. This means money and time to us.

We know our nets are being abused by sportsmen in boats, and even from some who use beach buggies.

If you see any of these bad guys please jot down the registration number on his boat, or in some way get the information to fisheries inspector James Taylor, phone number 728-2992, Beaufort, or fisheries inspector Woody Hancock, phone number 225-3871, Sea Level.

We would appreciate your help.

Sincerely,
Carteret Net Fisherman
Aggravated
By Flounder Thieves

Surprise!

Dear Sir:

Your fine magazine does not publish many letters from your readers and for that reason I don't expect this one to be printed.

I enjoy the articles by Charlotte Hilton Green very much but wonder about her statement in Carolina Bird Club—Past and Present Part 2 (as opposing the prevalent custom of sportsmen, during the holiday season, of contests over "killing every wild thing in fur and feathers"). If this occurs and I'm sure it does, but not on a widespread basis, it is done by irresponsible persons and possibly by a drop out from a Bird Watchers Club—not real sportsmen.

In all seriousness, the wildlife of our country is afforded more protection through the acquisition of lands and game laws, paid for more by the sportsman than by Bird Watchers Clubs.

Bird Watchers have their place for though their monetary contributions are not large the information they gather is invaluable and the role they fill a very necessary one.

God Bless all Bird Watchers and "me too!" for I'm one.

Sincerely,
R. H. Lewis
Bell Glade, Fla.

Before the summer's up, you may find some "globs" like these in your pond or in that of a neighbor. Don't become alarmed; they are colonies of fresh-water bryozoans ("moss animals") known as pectinatella. They won't hurt a thing, and will disappear with cold weather. Photo by James Griffin, USDA, Soil Conservation Service, Johnston County.

HELP COAST GUARD

• **continued from page 8**

monitored by *all* Coast Guard air and surface craft is 2182 kHz, the International Calling and Distress Frequency (voice). All surface vessels and aircraft also have two-way capabilities on the common ship-to-ship frequencies in the medium frequency marine radiotelephone band, such as 2638 kHz and 2738 kHz.

Some of the aircraft have the capability of two-way communications on VHF (marine) and Citizens Band (CB). This is mostly limited to helicopters, but will probably eventually come to the amphibious fixed-wing aircraft also.

If CB or VHF is all you have and a fixed-wing Coast Guard plane makes an appearance, don't hesitate to try making contact with it. They might have added either or both systems by the time this appears in print, and there is always the possibility that there is also a helicopter within radio range that you don't see. Or someone on land may hear you and relay a message.

Before you start talking on your radio, particularly 2182 kHz, listen for a short while. You might be interrupting someone else's distress message. Also, 2182 kHz is the frequency most commonly used for "homing" in on a lost boat with radio direction finding (RDF) equipment, and your transmission could easily cause the tracking aircraft to lose its way.

Remember that your radio transmitter can cause quite a drain on your battery, particularly if your engine won't run and thus drive the generator to recharge it. Save your breath and try to make the most out of the remaining time before the battery runs down. It could be real tough to run out of transmitter at a crucial point in the rescue operation.

You can probably save yourself a lot of grief and lost time if you will take the trouble to learn the limitations of your boating equipment, and how to perform some simple emergency repairs.

Check your gas before leaving the dock. Don't trust anyone else to do it for you. Carry spare spark plugs, a spare prop or two, spare shear pins (if your motor uses 'em), cotter pins, etc. And tools. You would feel like an idiot if you found you had spare parts and no way to install them.

A disgusted Coast Guard officer recently told me that over 25 per cent of the rescues conducted during the previous three day holiday week end were due to some simple malfunction that the skipper could have easily fixed himself.

Such as cleaning or replacing spark plugs, or reconnecting a loose wire in the ignition system. Or checking to make sure there was sufficient fuel on board before departing from the dock. ⬍

TROUT TACTICS

• **continued from page 13**

If funds are severely limited, simply get a few Wulff Royals, and add the others later.

Nymphs are good in North Carolina streams, and there are many patterns that are effective. A good starting selection would consist of a few Tellico Nymphs, Gray Muskrat Nymphs and hard-bodied black ants (the kind you use for bluegills). Sizes 10, 12 and 14 are probably most popular, but some experts get excellent results using huge nymphs. By all means, fish with your nymphs even if you have to use them as droppers under a big dry fly to help you detect a strike. A good nymph fisherman will outfish his competitors using other techniques or flies. Make sure you buy nymphs that have been weighted with lead wrapped on the hook under the fly dressing.

Sometimes, particularly early in the season, a weighted white marabou streamer or Black Nose Dace streamer will catch fish. You may notice that no wet flies have been suggested. That is because wet flies are not as popular as they once were, being replaced largely by nymphs. If you feel you need some, the Coachman is a good choice, and the Wooly Worm is often quite effective perhaps because it is really more nymph than wet fly.

Finally, let's consider some other equipment. Most important are felt-soled waders or wading shoes. If you don't use felt on the bottoms of your shoes, take out a good hospitalization policy against falls. You can buy felt-soled waders and shoes, or you can use waterproof rubber contact cement to glue carpet to the soles.

Actually, waders are only necessary during the early spring, late fall or winter. At other times, most fishermen merely wade wet in old trousers using felt-soled leather or canvas shoes. Tennis shoes with carpet glued on the soles work well.

A vest is not a necessity, but it is a convenience few anglers would be without. You can pick up an inexpensive one for less than $10, and carry everything from flies to sandwiches and rain gear. A list of other helpful accessories would include a net, polaroid sunglasses (a tremendous aid in seeing through the water), insect repellent, a small pair of needle nose pliers or surgical forceps for removing flies from fish (and elsewhere), and a creel if you plan to keep any fish. It's also a good idea to wear dark clothing as camouflage.

It does not take long to learn to fish successfully for trout using flies, but the real beauty of the sport is that you cannot possibly live long enough to learn all there is to know about it. Every trip is a new education.

Nor is fly fishing for trout an ineffective way to fish. I am firmly convinced that a good fly fisherman will catch more trout than anyone else over the entire season. Once you have learned to catch trout on flies, you will find that you not only catch more fish, you'll have more fun doing it. ⬍

Brook Trout

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Wildlife IN NORTH CAROLINA

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PHOTO BY REX GARY SCHMIDT

Fishin' Time

A list of the great rivers of our state is a long one, dotted with such names as the Pasquotank, Roanoke, Tar, Neuse . . . waters to be guarded and maintained as near to the way Nature intended as possible. The Chowan, shown here, is among those fighting for their lives.

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 99,391

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 5 MAY, 1973

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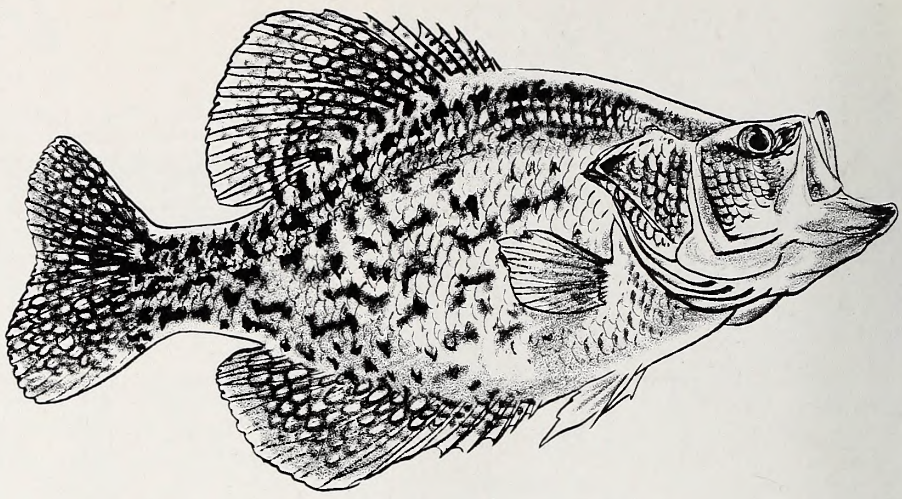
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

With markings and color patterns of no other American hawk, the little sparrow hawk appears almost too dainty to be a member of such a mighty family. Less than 12 inches from beak to tail tip, this bird confines most of its feeding to insects and mice. It, along with all of its hawk relatives, is protected by law. Watercolor painting by Ron Jenkins, Missoula, Montana.

The "Save-a-Trip" Fish

by Pete Elkins
Lexington, Va.



BOB Avery's tackle shop in Lincolnton, North Carolina, was crowded as usual. I'd driven south from Virginia to join Bob for a few days of white bass action. I walked to the rear portion of the shop where he was talking with a group of fishermen. Almost before we'd finished shaking hands, Bob nodded toward a big live tank, "Want to see a big crappie?"

Even though white bass were foremost in my mind, I mumbled an affirmative reply. When Bob lifted the net from the water, all driving fatigue disappeared. The net contained a crappie bigger than any I'd ever seen. Green, silver, and black shimmered through the well-filled net as three pounds nine ounces of white crappie twisted in the meshes.

"He was caught this morning in the river where we'll be going for white bass," Bob explained. We returned the oversized crappie to the tank and walked outside to join a cluster around the side of a trailered ski barge. Three men were counting crappies in a live bait well inside the boat. I looked inside the fish well, and for the second time in less than fifteen minutes, I couldn't believe my eyes.

The live well was brim full of shining crappies, most in the one to two pound class. "We ate all the smaller ones for lunch," one of the fellows inside the boat said.

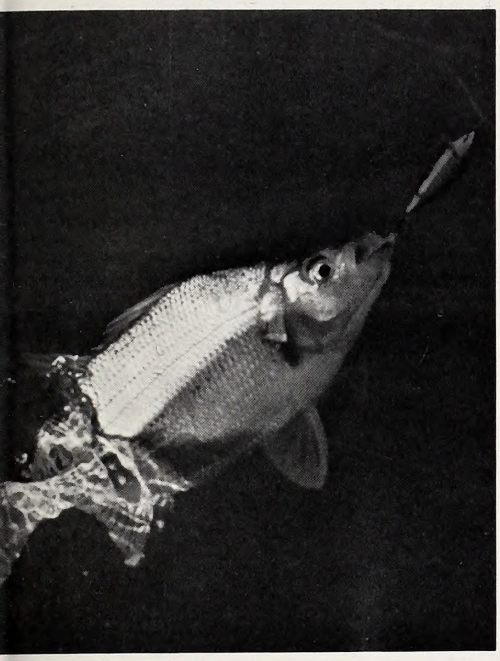
"Do you want to fish crappies tomorrow instead of whites?" Bob asked. Apparently, he'd noticed that my eyes were a little big after seeing the boat full of crappies.

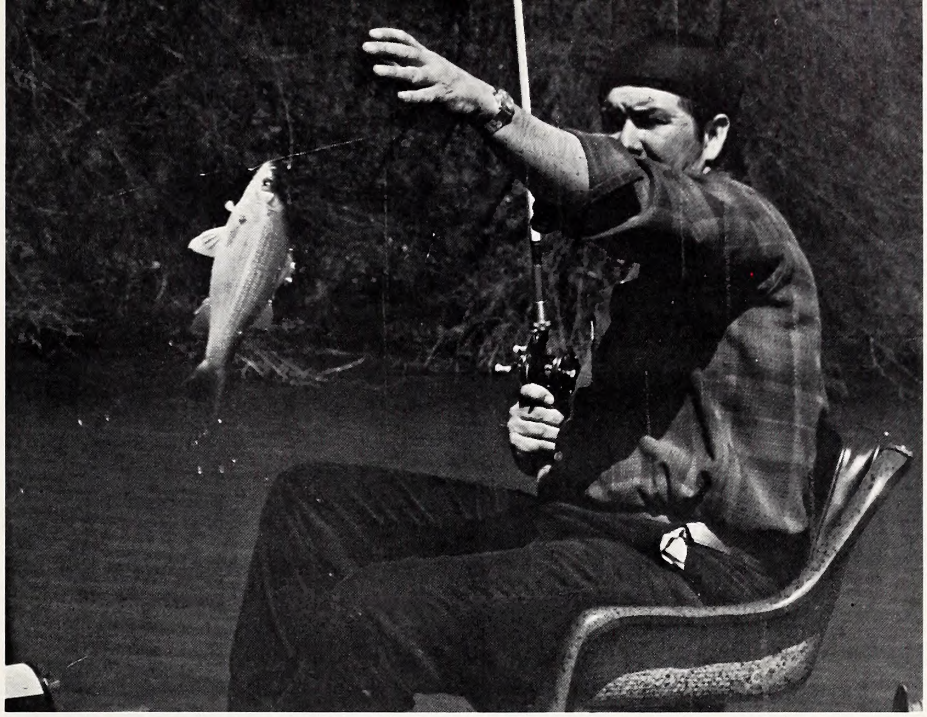
"No," I replied, "let's stick with the white bass."

After a few minutes of conversation, Bob and I had decided on the next day's tactics. I was to meet him at 5:50 outside the tackle shop, then we'd drive his rig over to the river, actually the extreme upper part of Lake Wylie at Mount Holly, North Carolina. We'd be using ultralight tackle and white jigs for the spawning whites. We were a bit early for the best of the "run", but Bob thought that we'd find a few fish in deep holes or below the Mountain Island Dam.

The night passed restlessly, as do most nights before a long-anticipated fishing trip. Finally, after a few hours sleep, I drove from my parents' home near Lincolnton to Bob's Piedmont Bait and Tackle Shop. A few minutes later, Bob's pickup pulled in, towing a sixteen foot astroglass bass rig with a 115 hp. Merc. I knew that we wouldn't waste much running time during the day. Bob's eight-year-old son, Robbie, looking much more awake than either Bob or me, was eager to try out a new rod and reel. I stowed my

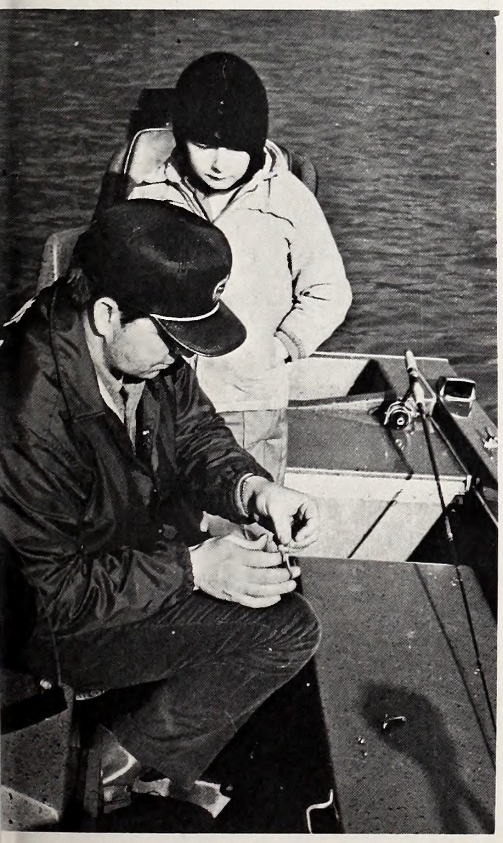
One of the first places to head for, if you're after crappies, is some sort of shelter like these partially submerged trees. If you want the crappies, you'll have to go in after 'em.





White bass, the striper's smaller cousin, hit shad-like plugs and spinners. You may have to experiment with various lures and fishing depths. Bob Avery (above) scored using a live shad.

Photos by the Author



"Now, here's how it's done," as a minnow is readied for a waiting crappie. Fathers know everything . . . . don't they?

gear aboard the boat, and we were on our way.

As we drove south toward Mt. Holly, I thought back to a year ago April. I'd gone into Bob's shop to pick up some lures. Bob and another fellow had just returned from a morning's trip with an ice chest filled with chunky white bass, up to three pounds topped off by a seven-pound largemouth that had belted a white jig at the mouth of a tiny creek. I knew then that I'd be back to try some of that fishing myself next year.

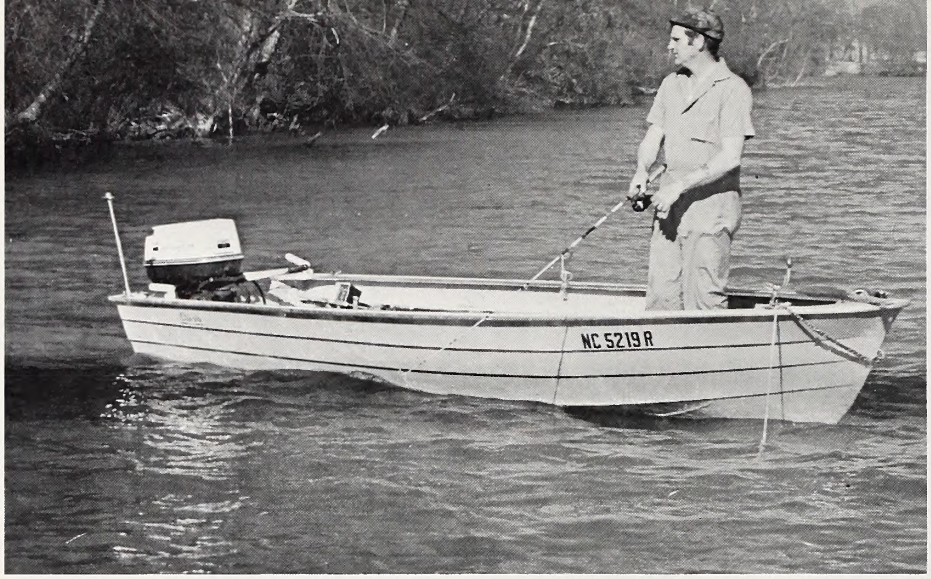
Now next year had arrived, and Bob was afraid that we might be a few weeks ahead of schedule for the white bass. Soon, we rolled into Mt. Holly, turned off the main road to a concrete launching ramp. Five minutes later we were purring our way up the mist-shrouded river. The shoreline was rich with overhanging trees and deadfalls. An occasional stream mouth led mysteriously away from the main channel, sure spots for white bass at their spawning peak.

We slid to a stop over a hole Bob had discovered earlier with a depthfinder. Robbie began expertly casting a "gayblade" metal lure. Bob and I rigged up with large minnows, allowing them to drift free in the current. Bob drew first blood with a yearling largemouth that splashed cold water into the boat. I followed with a smaller bass, that obligingly shook free beside the boat.

As the morning progressed, Bob's predictions bore sad fruit. The water was still too cold for the white bass to school up for their spawning activities. They were scattered and deep, waiting for rising temperatures to trigger the timeless urge to reproduce. But we had an ace up our sleeves, a silver and green ace finning under the thick brush along the shoreline.

To confirm my thoughts, Bob urged, "Let's try the crappies." From that point on the action picked up. Our rigs were simple and effective: a small sliding bobber set to stop four feet deep. Later as the water warmed, the crappie would move up to within a foot or two of the surface.

After a steady diet of artificial lure fishing for largemouth and other larger species, the morning's crappie fishing was a return to a time when fishing was simpler, less scientific, and perhaps even more fun. A bobber is a magic thing as it floats red and white suspended between the river bottom and the blue sky.



A brush-lined shore near an incoming creek spells both white bass and crappie. Lester Martin works a plug for white bass.

As you watch it intently for any change, your imagination is poised for anything. Then finally, the bobber shudders once, trembles, and sinks slowly, steadily beneath the surface. Waiting for a moment to allow the crappie to fully take the minnow is a grueling test of self-discipline. Now. Far enough. The rod lifts, comes tight, and heels over against the slow thrashing of a deep-bodied crappie.

There's no room for finesse in a brush pile with the crappie clan. Playing a fish is impossible because of the wooded maze beneath the water. Lift the crappie smoothly out of the water and into the boat. The fishing can be frustrating because the crappie love to frequent spots where only a contortionist could reach with a baited hook. Hang-ups and snags are part of the game, so we carried plenty of extra hooks and bb split shot.

The crappies came steadily, if not spectacularly, throughout the day. Later in the afternoon, we tried the white bass again, but they were still being coy. Bob explained that the white bass are whims of the weather. Normally, the whites start their spawning runs in North Carolina lakes and rivers around the last week of March, with the "run" continuing through May.

During April and May, one of Bob's favorite methods is to anchor his boat at the mouth of a shallow creek, climb overboard, and wade up the creek, hunting over a light spinning outfit and 75 countdown rapalas or white jigs. Other good lures for this exciting fishing are Thin-Fins and Rebel shads in silver/blue finish.

In June, the white bass action shifts to the open water where the bass will "school" until September. Schooling fish can be spotted on the surface feeding voraciously on shad schools. A cautious approach and long casts can produce frantic action. When the white are not visible on top, fishermen either troll with jointed L & S mirrorlures in red and white pattern, or drift live shad deep for the chunky white bass.

Gathering shad for bait is one of the most exciting aspects of Bob Avery's white bass techniques. During the second day of our outing, we motored up to the base of the Mountain Island Dam to gather shad with longhandled nets. Bob prefers small shad and hooks them carefully through the bony part of their nose, allowing them to survive on the hook for a surprisingly long time. Shad are effective, but tough to keep alive, especially during hot weather. "We use an aerated tank during the summer," Bob explained. Bait gathering at the dam can be dangerous because the sudden opening of a turbine can catch an unwary boater. "Never, never tie up or anchor right below the gates," Bob warns. As long as the engine is idling and the boat is drifting, there is minimal danger.

Even with the usually deadly shad, the whites continued to elude us. We took a few, but nothing like the two weeks that would undoubtedly follow my departure back to Virginia. "O.K., Bob, let's find some action," I finally exclaimed.

Bob knew what I meant. Back we went to the brush for what was turning into my "save-a-trip" fish, the crappie. They were there in good numbers and eager to gulp the tiny minnows and fight their twisting fight deep in the bowels of a drowned tree. We continued to use minnows even though Bob said that small white jigs produced equally well.

Crappies were not only salvaging our trip for the whites, but they provide good year-round action on Lake Wylie and other Tarheel waters. Bob elects February through April as the peak months, since the crappies are in three- to six-foot depths around brush and downed trees.

During the summer and early fall, night anglers slay crappie by hanging a lantern over the side of their boat. First come the bugs, then the minnows, then the crappies and white bass.

All too soon, my two-day trip was over. I regretted the cold weather that had stalled the white bass, but the crappies had saved the trip. As we shook hands, I told Bob that I would be back soon. Lake Wylie offers excellent largemouth, striped bass, white bass, and sunfish action most of the year. "The whites ought to be running good in about a week," Bob tossed out as I got into my car. That sounded great to me, but I could still see that huge crappie in the live tank in Bob's shop. I'd be back all right.

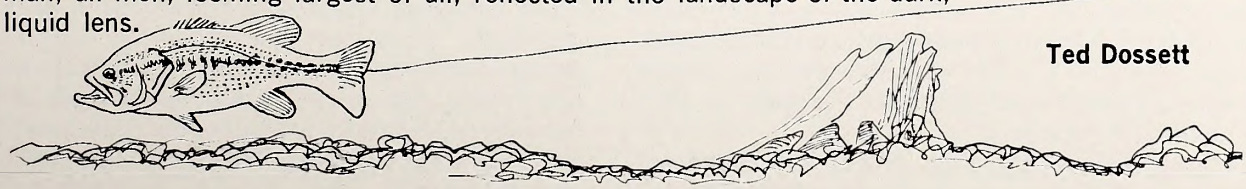
If you're in Tarheel country, drop by Bob's shop, Piedmont Bait and Tackle, in Lincolnton for up-to-date information about the excellent fishing in the area. ◆

Reflections... in a Fish's Eye

RECOGNITION came slowly, as if the lure had pulled from a rotten limb or a clump of pond weed. But the gentle insistence remained, almost like a disdainful turning away — and then it became a fish. He awaited the urgency that would stiffen the line, and when the resistence quickened, he knew the fish was a good one. For the first time in its existence, the creature sensed denial, and the angler could feel the desperation trembling across the bail and through the line as it stripped from the spool. The fish raced back and forth across the pond, slightly billowing the line that followed wherever it went. The placid surface of the pond, mute to the violence beneath, was shattered as the silver-green shape thrust upward in rigid contortion and then fell heavily back. There was another run, shorter, in a tight hard circle, but then the quivering rod tip steadied, resistance became a spent thing, merely weight, and the fish was defeated.

He felt the ridges of fine teeth against his thumb as he swung the fish up and saw the tiny absurd jig wedged in the corner of the huge mouth. He looked at it carefully as it lay on the grey planks of the dock. Droplets of water trickled across the neat rows of scales. The fish flared its gills and thumped its thick body against the planks. Then he noticed its eye, staring directly up at him. It reflected the sharp blue sky and the piled-up thunderheads leaning into it. Encircling the thin golden rim of its iris were pines and alder branches. A kingfisher, viewed for many years now with impunity, was a tiny speck slipping across the opening of blue. And then, distorted and featureless, he saw himself . . . man, all men, looming largest of all, reflected in the landscape of the dark, liquid lens.

Ted Dossett



Spring Brings Excitement

by Lunette Barber
Clayton

PHOTO BY JACK DERMID

This is a scene out of the not-too-distant past. Barber's Mill is gone, but Swift Creek remains along with the migrating shad and eels.

No, "The Creaking Old Mill Is Not Still, Maggie". There were many grist mills in Johnston County in pioneer days run by water power. I do not like to write in first person, but the first outdoor sound my ears received was the roar of the water pouring over the dam because I was born near the grist mill pictured here.

The mill was built on Swift Creek in Cleveland Township about six miles south of Clayton by B. T. Barber, Sr., and his wife Sarah Tomlinson Barber in 1878. The turbine that furnished the power was bought in 1878 from the Lane Manufacturing Company in Montpelier, Vermont. The rocks that ground the wheat and corn came from Esofar Creek, New York, and were much older than the turbine itself.

Today the mill is gone, but memories linger and fishing continues. As Father Time kept up his pace, patrons gradually declined to have wheat ground, and later the City of Raleigh impounded the water for its use, and eventually the custom of grinding corn came to an end. And too, it became easy to buy flour and meal in stores.

The mill was always operated according to the old law, passed in 1777, which declared that one-eighth of the amount ground "by windmill, steam, or roller" should be the toll charged the farmer. This was a barter deal. That was the miller's principal source of income.

The mill was a meeting place for neighbors, friends, and strangers who brought good news, bad news, gossip, discussions of weather, politics, new inventions, and history. Many fished while their wheat and/or corn was being ground. Largemouth bass, bream, catfish, and other fresh-water fish were caught near the mill where the fish came to feed on husk and grain that dropped from the building into the water.

The most exciting events of the year happened in the spring. The turbine began slowly in the spring of the year and Oh, how excited we became! It was the annual "eel migration". During these two months scores of eels—some very large—clogged the wheels of the mill and stopped rotation until the eels were removed. The eels were chopped out from around the wheels with hatchets, and we filled bushel baskets with them. Did you ever hear of fish meal as a food supplement? No, we did not throw the eels away—we fed them to the hogs.

The eel is among the most interesting creatures known because it is *catadromous,* living in fresh water and going to salt water to spawn. It took a Danish Biologist seventeen years to find the spawning grounds! The American eel and the European eel, two species of the family, have deserted their ancestral habitat in favor of a fresh-water existence. They have not effected a complete break away, however, for they still must return to salt water for spawning. Strangely enough, both the American and the European eels spawn in the same general area, the Sargasso Sea in the western Atlantic between Bermuda and the West Indies.

PHOTO BY E. P. HADDON, FISH & WILDLIFE SERVICE

The life and travels of the American eel make a fascinating story, one that only Nature can fully explain. The eel, a true fish, can travel short distances over-land in the trips to and from the spawning grounds far off our coast.

The female eel produces about 10,000,000 eggs. The eggs hatch releasing a larval stage that bears little resemblance to the adult fish. The laval eels, or "Leptocephali" as they are called, drift northward with the Gulf Stream, the American species developing into the young eel stage as they approach the North American continent. The European eels continue on as larvae in the Gulf Stream until they reach the European shores some six months later. Young eels are only two to three inches long when they leave the ocean for fresh water but they are already two or three years old. The American eel matures at six to eight years of age when it retraces the long journey to the Sargasso Sea, there to spawn and die.

The American eel also known as the Boston eel, the common eel, and the Atlantic eel will not be confused with any other fish found in fresh water with the possible exception of the lamprey (the absence of true jaws and paired fins immediately identifies the lamprey). The American eel has a long snake-like body with true jaws and conspicuous pectoral fins. The dorsal, caudal and anal fins are united to form a single continuous band around the posterior end of the body. The eel appears olive on the back, shading into green sides and white underparts. The scales are almost microscopic in size, deeply imbedded and giving the skin a velvety sheen. Reputedly, an eel over 16 inches in length is a female as is any found far from tidewater.

The American eel is found in almost all waters that ultimately drain into the Atlantic Ocean and which are not blocked by impassable dams. In North Carolina, the latter factor precludes their presence in waters of the Little Tennessee, Savannah and Catawba watersheds. East of the Yadkin, however, the eel is very commonly found, sometimes even in land-locked ponds into which they apparently migrate overland during heavy rains.

The American eel first appears in North Carolina waters around the last of April in almost unbelievable numbers. Clouds of two- or three-inch eels often are seen near the banks of the larger coastal rivers slowly beating their way upstream. The survivors remain in the larger waters until the onset of sexual maturity five or six years later at which time they drop back to salt water and retrace their long migration back to the Sargasso Sea.

The American eel reputedly is the most voracious of all carnivorous fishes. It is almost exclusively a nocturnal feeder. They are frequently caught by angling but mostly by commercial fishermen on trot lines or in traps, usually called "eel pots". The eel will eat almost anything. Stomach analyses have revealed water plants, insects, crayfish, frogs, fish eggs, (including smaller eels), garbage, water birds, and even water rats. The white flesh of the eel is highly esteemed, and it is frequently smoked or otherwise cured as a delicacy. To prepare the eel for cooking, it must be skinned.

Since the old mill is gone, fallen into the stream, excitement continues. Fishermen, and many of them, come from far and near to catch the "spring fancy", the American shad. Other shad come but the American is the choice. This fish is *anadromous,* living in salt water and coming to fresh to spawn. Most of them are caught in bow nets. Notice the fisherman's hand in the picture. The bow with the net is submerged and a strong cord is fastened to the bottom of the net. The water runs gently

PHOTO BY REX GARY SCHMIDT

Our coastal shad, the white or American shad, and the hickory (shown here) furnish fine sport when the water is right each spring. Clean water is necessary to keep them coming back.

and when a fish strikes the net the fisherman is alerted and pulls up his "catch." In many places shad are caught with hook and line.

The shad belong to the same large group of primarily marine fishes as do the herring. This group is characterized by a single dorsal fin without spines, no lateral line, poorly developed jaws in which teeth are either very inconspicuous or totally lacking. Most have strongly keeled midlines along the belly. The representatives of this group found in fresh water closely resemble their cousins, the oceanic sea herring and the menhaden, and also show their more distant relation to the tarpon. All are bright silvery fishes commonly traveling in large schools.

Most shad and herring found in fresh water actually are marine fishes which return to fresh water to spawn. All provide important forage for the larger carnivorous fishes and some are economically valuable food for man. The shad and herring found in the fresh waters of North Carolina are the American shad, hickory shad, alewife, glut herring, gizzard shad, and the threadfin shad. Some of these are rather difficult to positively identify, particularly during their juvenile stages.

The American shad, also known as white shad, shows its very close affiliation with the other herringlike fishes, being physically distinguishable chiefly by the lack of teeth on both tongue and jaws and the fact that the lower jaw is approximately the same length as the upper jaw and, when closed, fits into a deep notch of the upper jaw. The body is dark green along the back, blending rapidly into the silvery sides and the sharp white belly. A series of dark spots, one large followed by several smaller ones arranged in one or two rows, appear at the eye level immediately behind the gill covers. The scales are very loosely attached and from 60 to 65 are found along the lateral line. The dorsal fin contains 13 full rays, the anal fin 19.

The American shad is primarily an ocean fish that enters fresh water to spawn—where the resulting progeny reside their first summer of life. Shad runs, locally considered the true harbingers of spring, occur during March and April in a series of waves. The early-running fish generally are predominantly males or "bucks," the later runs, mostly females or "roes." Spawning occurs in the larger streams during late afternoon and often near the confluence of warmer tributaries.

Shad eggs are spawned free with 25,000 to 30,000 eggs produced by the average-size female. The eggs are heavy and quickly sink. Successful incubation is dependent upon the eggs reaching a clean, sandy bottom. The incubation period lasts six to 10 days depending on prevailing water temperatures. The young shad remain in fresh water until autumn by which time they reach a length of about three inches. With the onset of falling water temperatures, the young shad drift downstream and out to sea from whence they will return to spawn after three or four years. The American shad feeds principally on plankton throughout its entire life. The average male shad taken during the spawning migration weighs about three pounds, the females being about one pound heavier. In the past, shad weighing up to 14 pounds have been reported.

The American shad is primarily a food fish and, back in the 1890's when six to eight million pounds were harvested each year, the shad was the most valuable of all North Carolina fishery products. Pollution, siltation of spawning rivers, and overexploitation have reduced the shad population to a mere remnant of its former magnitude. During recent years, the American shad has become a very popular sport fish, particularly along the Tar and Neuse Rivers during that period. Shad frequently will strike a small spoon or spinner and, because of its very tender mouth, considerable angling skill is required to effect a successful landing.

Father Time is man's sponsor, and Mother Nature is mistress of ceremony. So with the old mill gone, flour and meal purchased in super-markets, Raleigh's stopping the water for its use, and other changes during the past 95 years, what will the year 2078 bring to the little tributary, Swift Creek, and Neuse River?

We cannot answer that question, but a large, fresh, American shad makes a grand traditional meal during the Easter season. Especially is the roe delicious when scantily wrapped in bacon and broiled. Let's enjoy them while we may. ⬍

Carolina Wolf Spider

by Michael A. Godfrey
Hillsborough

The seventh in a series of biographical sketches of wildlife species with "Carolina" in their names is a spider. What do you know about it?

BEFORE anyone screams in terror and runs for the aerosol bomb, let him(or her) spend a moment getting to know this Carolinian. She is the Carolina wolf spider, the largest member of an extraordinary and cosmopolitan family, the *Lycosidae*. Lycosids live close to humans the world over and are unusual spiders for at least two reasons. They spin no capturing webs, and they are among the very few non-vertebrates who show any interest in their young other than as menu items.

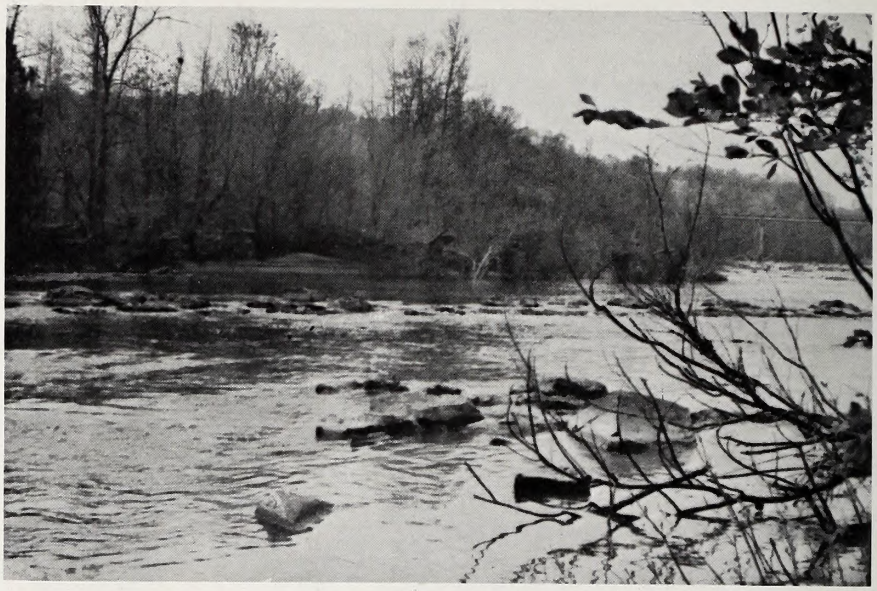
The photograph above, taken in Orange County one September, shows a mother wolf spider carrying her young who have just emerged from the egg capsule still cemented to her abdomen. A few minutes after the picture was taken, the last of the spiderlings hatched, and the mother discarded the capsule. In taking her picture, my wife and I accidentally jostled the spider, knocking several of the youngsters from their perch. The mother stood motionless while her young scurried up her legs and resumed their piggyback positions. There they would stay for about a week enjoying the mother's protection until their first molt. Some scientists believe the spiderlings stay on their mother until hunger and sibling cannibalism drive them off.

Meanwhile the mother spider pursues her business, which consists mostly of capturing her prey in hot pursuit. The practice of running down their victims rather than capturing them in a web has earned the wolf spiders their name. They have excellent eyesight and can zero in on a victim a foot away to make the catch after a quick dash. These traits make the wolf spiders especially useful around human habitations, where they can pursue such destructive household pests as cockroaches and silverfish into inaccessible places in the woodwork.

Although the wolf spiders are completely harmless to humans, there are people who are quick to say that they would rather have the roaches and silverfish than a critter so creepy as a spider at liberty in their homes. Maybe. But then none of us knows how many books or sweaters or table linens he still has the use of thanks to the Carolina wolf spider's efforts as a pest controller. ⬍

ROCKY RIVER Bow Fishing Paradise

by Jerry Rushing



Rocky River presents some fine bow fishing opportunities, and plenty of real challenges to the bowman.

THE sun was dancing through the trees as Jim Hogan and I arrived at our favorite fishing hole on Rocky River. The gurgle of the water as it slid lazily among the rocks and the sweet smell of honeysuckle made a man appreciate this spring morning. Unlike most rivers with grassy marshes and lily beds, Rock River has swift currents, crystal "lakes" and plenty of rocks for the bow fisherman to stand on. Fish can be found in abundance during the spring run and this morning was no exception. Today it would be bow fishing.

Jim and I gathered our equipment and eased along the banks of the river. Jim stopped and eased back the old favorite bow and sent the fiber glass shaft deep into the crystal clear water. There was a dark grey streak and the water exploded as a medium sized gar surfaced with the shaft hung in his side. Jim smiled and began to play his prize up to the bank. Suddenly he realized he had two gar instead of one and he went wild. Nothing could quiet the excitement that had bubbled to the surface. He removed the gar from his rig and once more began his search for the big carp found in the river.

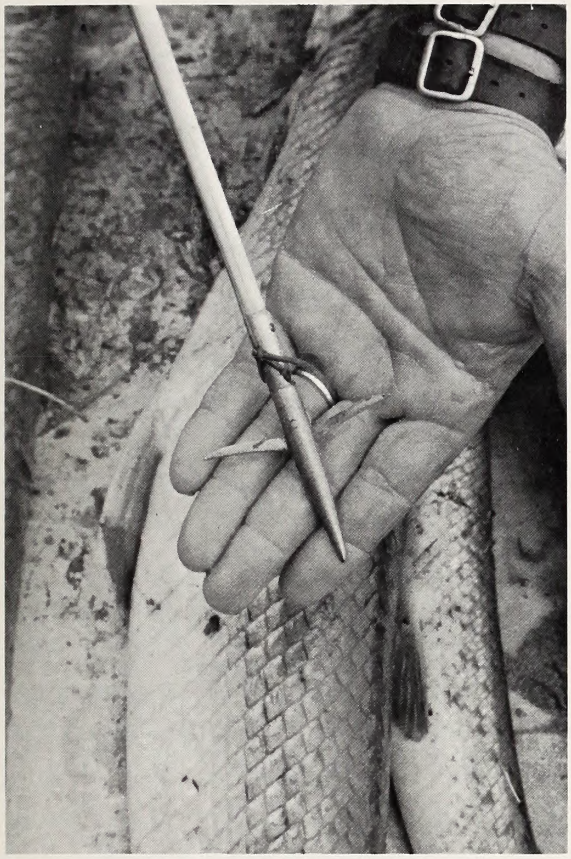
As the sunlight played hide and seek with the water, Jim and I walked along the base of a rocky cliff that rose some 60 feet skyward. My imagination took over and I could see myself and Jim as young Indian braves in search of fish for the evening meal. My bow hung on a bramble briar and the sudden jerk made me realize I had been day dreaming.

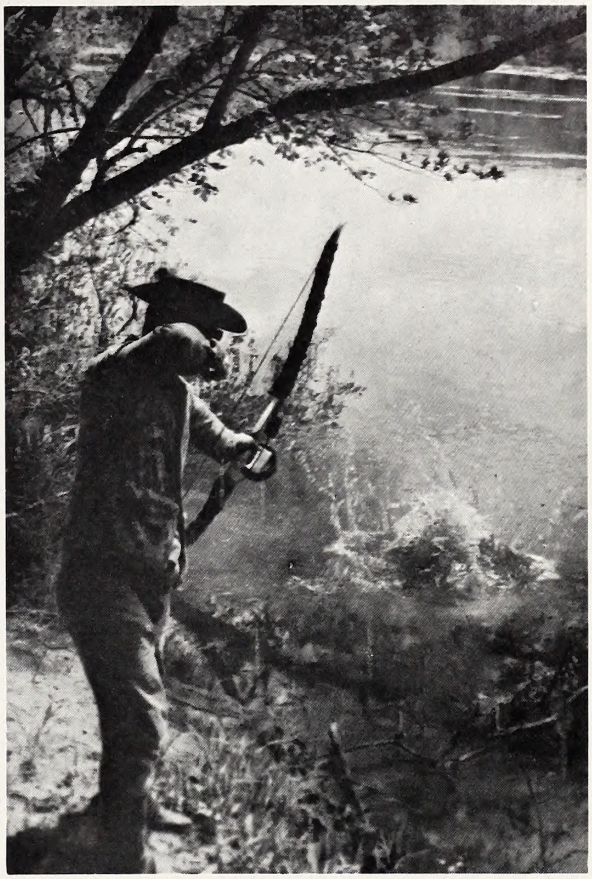
A couple more yards and it was my turn to try for a fish. A dark form slid lazily along the shadows of a willow and turned toward the bank. Now! I sent the shaft into the still water and a spray like a skier taking off was reward. The line began to peel off my rig as the big fish headed for the middle of the river.I grabbed the line and forced the big carp to turn back to the bank. After about five minutes I had him on the bank and was in the process of removing the sting-ray fish point. He was a beauty. A 10-pounder and a prize for any bow fisherman.

A few hundred feet down the river I heard the line feed off Jim's rig and the old familiar sound of "Blast it, I missed again", as Jim retrieved his arrow and rewound the line on his rig. He had hit a rock on the bottom of the river and had popped the nock off his arrow. Luckily I had thought to bring some extra nocks and a tube of glue. Jim didn't waste any time repairing his equipment and put it on a hot rock to let the glue dry.

While Jim waited for the nock to dry I made my way further down the river. Suddenly a huge bull frog jumped from under my feet and splashed across the water like a rock skipped on concrete, and disappeared below the surface. I was standing near the edge and worked my way to a rock in the river as a bass chased minnows in a deeper pool of water when I noticed a dark grey shadow approaching. Looking carefully and trying not to move, I saw the big spots on its fin and I knew this was a trophy gar.

Effortlessly and lazily he slid through the water. Three more feet and he would be in the opening of willow limbs and I could try a shot. Slowly I pulled my bow to full draw and as he reached the opening I sent the glass arrow sizzling into the water. The





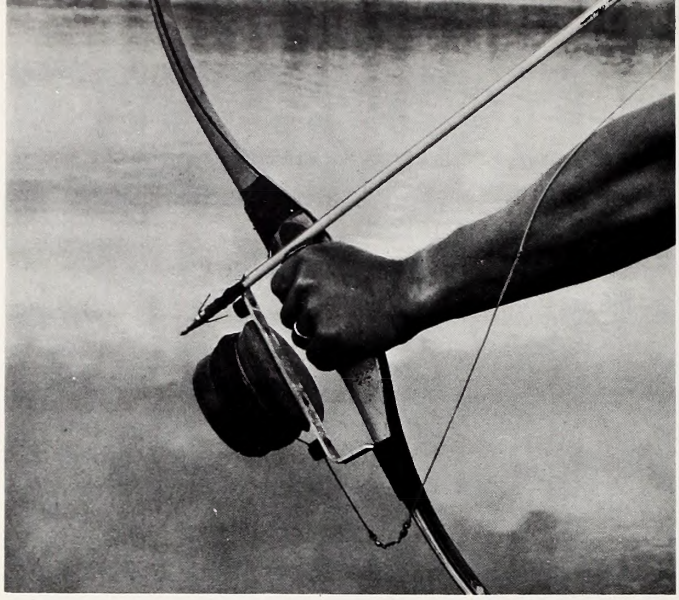
The special sting-ray fish point is one of the best for bow fishing. All equipment should be maintained in good shape, ready for the big moment when the shaft is slammed home. At right, a good day's bag of carp and gar. Both species get big, and some real tussles may await you.

line seemed to peel off for an hour and finally the arrow reached its destination. The gar seemed stunned for a minute then he exploded into a mass of fighting fury. He turned and headed for the limbs and safety. He succeeded in reaching the underbrush and tangled my line around one of the limbs hanging in the water. I realized I would lose him if I didn't do something and quickly. So in I went, shoes, clothes, and all. I struggled to keep my balance on the slippery rocks and at the same time try to catch up with my arrow. I lunged forward and grabbed the arrow by the point.

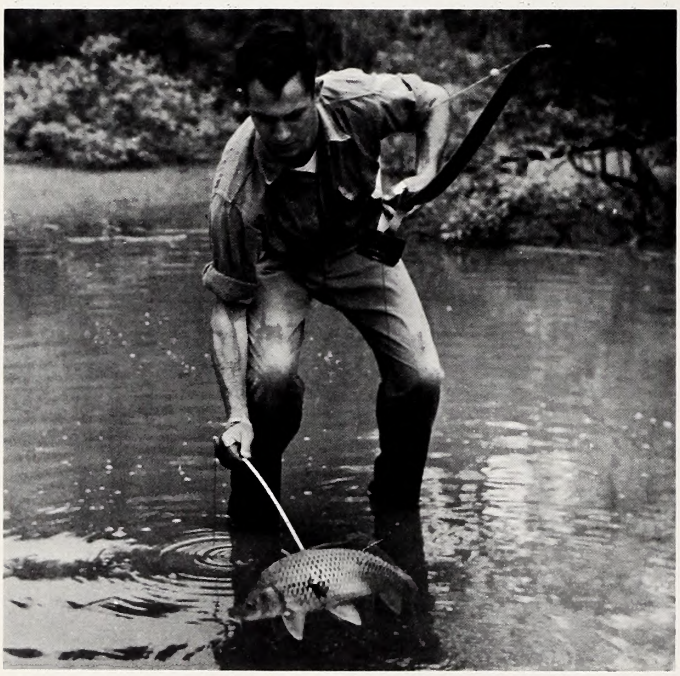
I managed to stand up and with the other hand on the string I threw the arrow and fish toward the bank. He tried to get back in the water but his fate already was sealed. He was a nice gar measuring 47½ inches long. This was close to the lead in our annual fish derby.

All the commotion and splashing had Jim excited and he ran down to where I was standing. As usual he was too late to help but it was nice of him to offer. I could tell he was excited because he wanted to help me land the gar that was flouncing at his feet. He had run off and left his bow and arrow so he had to go back and get them before we could move on down the river.

This gar would be considered a small one in some areas but in Rocky River he was considered a lunker. The fish are hard to find at times but this river offers a variety of fishing for the fisherman. I am a nature lover and spend about as much time simply looking around as I do looking for the fish. I enjoy the scenery as much as the game whether I am hunting or fishing. Just being out of doors offers a man a longer life than all the patent medicine and doctors in the world. I believe a man



Bow fishing equipment is fairly standardized but has many modifications. Here is but one arrangement and point type. Lakes (below) offer good carp possibilities in the spring.



raised in the country will out live a man raised in the city by as much as 20 years.

Now the sun was well overhead and the camouflage jackets we were wearing were getting warm. I slipped out of the shirt I was wearing underneath and put the jacket back on. Jim had moved ahead of me while I was stringing my fish and was busy playing with a screech owl he had found in an old hollow tree. Tiring of this nonsense, the owl departed for a quieter place to sleep, and we moved on in search of more fish. Jim found an old tree leaning out over the river and walked up in the top. He was searching the banks and shallows for an unsuspecting fish as I walked on down the bank.

Bow fishing was unheard of in Union County until a couple of years ago, and since then it has increased by leaps and bounds. A small group of archers got together and organized Sherwood Bow Club and the start of bow fishing. The walking and exercise a man gets while on the river will help him keep in shape and keep him sharp for deer season. Every once in a while you would meet a man shooting fish on the river, but now the entire family will pack a picnic lunch and spend the whole day roaming the river banks. This has become a family sport, like most things in archery, and helps promote game fish conservation. The carp and gar will muddy the streams and often destroy our game fish habitat and the water lily the ducks feed upon.

The sun was starting on its downward path as I reached the leaning tree and Jim. He had gotten tired of standing and had sat down and was swinging his legs like a nervous young 'un. The day had netted us several fish and a very nice gar to be entered in the fish derby.

Each year Sherwood Bow Club sponsors a derby and gives a trophy for the biggest carp and longest gar shot with bow and arrow. The derby is open to the public and runs from the first of April to the fourth of July. Last year's derby was won by Jim Kuykendall with a 53 inch gar weighing 22 pounds. He also won the carp derby with a 16 pounder.

Almost anywhere you go in the state of North Carolina you can find an abundance of carp and gar, and the wildlife protectors are eager to advise you of some choice fish-shooting areas. You can enjoy shooting fish and help clean up a stream at the same time.

Bow fishing is a sport the whole family can enjoy. All that's needed is a bow, a rig consisting of a fiberglass arrow equipped with the new stingray point and a reel to hold the line. Add this to a pair of polarized glasses and a bow fishing license and you have a combination for a day of fun and excitement. The license can be obtained by sending $1.75 to the Wildlife Commission in Raleigh. Send your name and address and the same information you have to fill out on your hunting or fishing license, and they will send your bow license in the return mail.

Like anything else, the more the cost of the equipment, the better chance you will have with the big carp and gar found in the rivers across the state. A bow with a sight window will out-perform a solid glass bow, and the fiberglass shaft will penetrate much better than a wooden shaft because it is heavier. The fish arrow is attached to a line held by a bow fishing rig and can be easily attached to the bow, either by tape or by snapping around the bow limbs.

A word of warning. Be careful. This sport, like most things in archery, is contagious. Once you try it you will be spending most of your spare time in the spring and summer walking up and down the banks of some river. All I can say is good luck and good fish shooting; but remember that in shooting fish, like fishing with a hook, the big ones can still get away. ◆

ALLABOARD

Boating Safety and Recreational Device

Designed by C. W. "Red" Russell

THE AMERICAN NATIONAL RED CROSS

INSTRUCTIONS

8′ x 16″ x 1″ (or ¾″ for 6′ board or lightweight crew) marine ply.

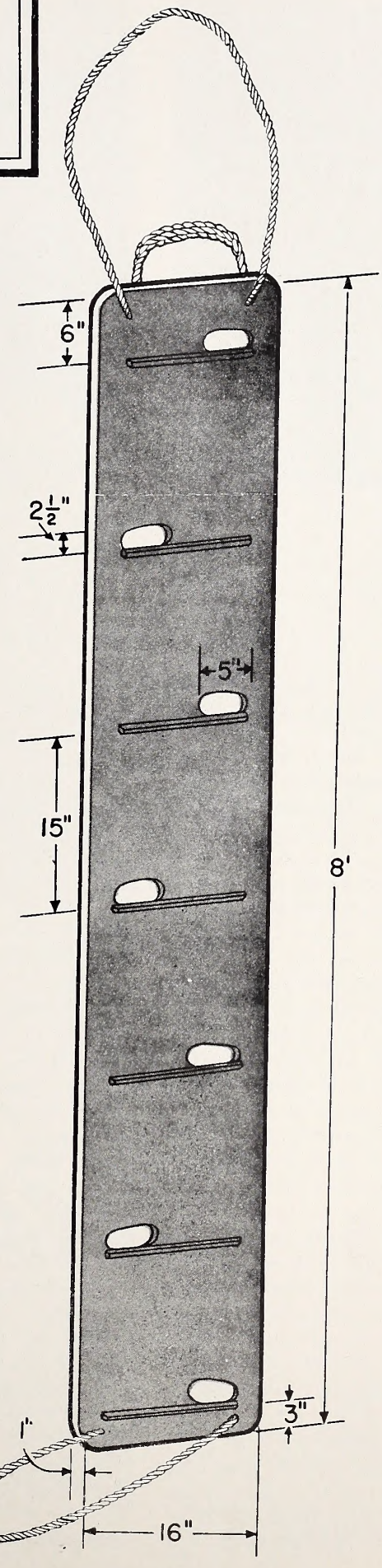
Round edges and fiberglass edges and one side (epoxy resin).

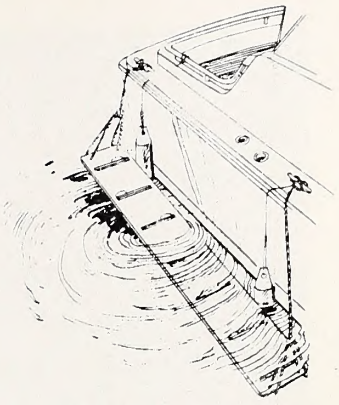
Cut hand and foot holes approximately 5″ x 2½″ (set back 2½″ or 3″ from edges of board).

Secure cleats ¾″ x ¾″ glued and screwed to board 15″ apart, flush with bases of foot and hand holes.

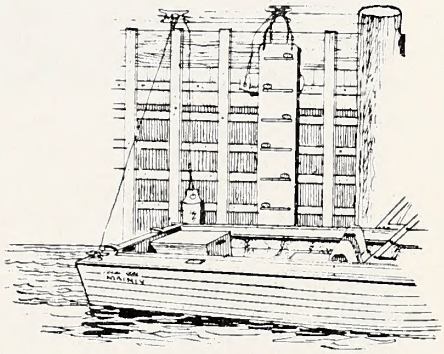
Splice rope grommet ½″ dacron, 5′ length (join ends with short splice), through rope holes ½″ diameter for snug fit.

Give five coats marine spar varnish on natural side and two coats white epoxy paint on fiberglassed side and edges.

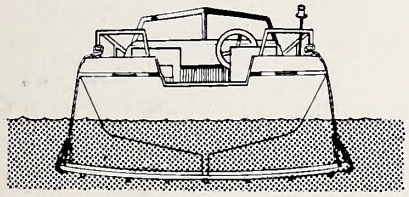




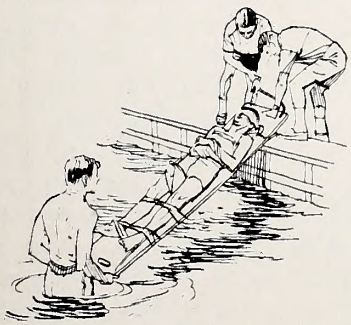
Swimming Ramp



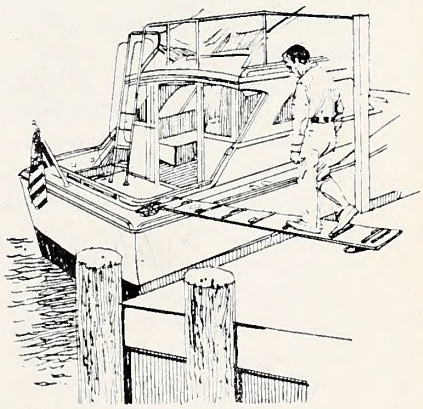
Ladder to Higher Elevation



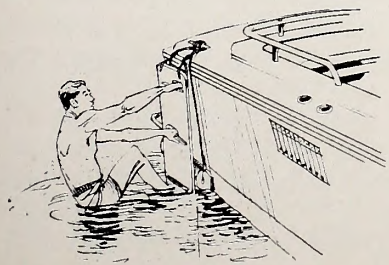
Flopperstopper To Prevent Rolling While at Anchor



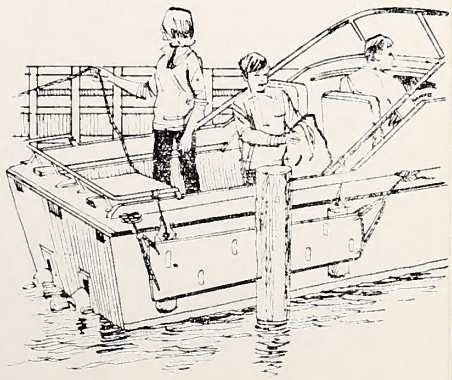
Litter for Sick or Injured Person, Either Aboard or in the Water



Gangplank



Ladder for Overboard Victim or Swimmer



Fenderboard

ARC 2141
JULY 1970

THE ALLIGATOR

by Betty R. Ford
Hickory

Unloved— But Wanted

PHOTO BY DARRELL LOUDER

PHOTO BY LUTHER PARTIN

The alligator leads a precarious life. Its habitat is threatened, its young kidnapped, and its valuable hide makes it attractive to poachers.

Alligators are not lovable. No one has produced a TV show starring an alligator—not even as a villain. They are just not the people's choice as a pet, though once the sale of baby alligators—and more recently, caymans—has run into the thousands in the United States. There are always little boys who love snakes and snails and other creatures.

Women also love alligators—in shoes, handbags and other accessories. Hundreds of thousands of alligators have been slaughtered to provide their hides for women's vanity.

Now outlawed as legal game, records of 460 poachers have shown 127,000 killed in the southern states in the past three years. It is impossible to determine the vast unrecorded quantity destroyed and their hides sold to appease the eager buyers. Poachers get $8 to $9 a foot for the skins, the middleman marks them up to $10 to $12 a foot for sale to tanners in other countries. After these hides have been tanned into leather, they are worth about $60 a foot.

With the strict game laws protecting the American alligator in the United States, it was thought they were increasing in number and were becoming a nuisance in areas where they were seen. Small alligators were popping up in lakes and rivers inland from the swamps. At first it was assumed that they were an overflow from the coastal areas, but under investigation they were found to be the small pets that had grown too big for safety and convenience and were discarded into nearby waters.

The largest preserve for these alligators—*Alligator mississippiensis*—is the Everglades National Park in Florida. The only subtropical National Park in the country, it is the refuge for 22 different endangered species—American alligator, everglades kite, roseate spoonbill, great white heron, the snowy egret, osprey, bald eagle, manatee and the Florida cougar. Established in 1947, it encompasses 2,188 square miles of coastal mangroves and islands, sawgrass savannas with low eminences clad in cabbage palm or slash pines or tropical hardwoods.

The American alligator was named by the Spanish seamen who spoke of them as lizards—el largato in Spanish. Later English sailors adopted the Spanish name but ran the two into one to make "allagarter"—which further became alligator.

The alligator weighs up to 500 pounds, and can reach 15 feet in length, with the tail one-half the length—the largest recorded was 19 feet 2 inches. They differ from crocodiles in that the snout is broad, not pointed, and the large fourth teeth do not show as they do in crocodiles. The alligator has 19-20 teeth on each side of the jaw. When the mouth is shut, the upper teeth lie outside the lower. Their valuable skin is roughened, leathery and thick over most of the body. The eyes and nostrils are placed high on the long head. The male bellows or roars and is one of only two reptiles that utter vocal sounds. They cannot survive low temperatures and may hibernate and aestivate two or more months each year. Sluggish, they spend most of their time basking on the banks of rivers or in swamps. This inactivity is thought responsible for their long life span of more than 50 years. They range in rivers and swamps of lowlands of the

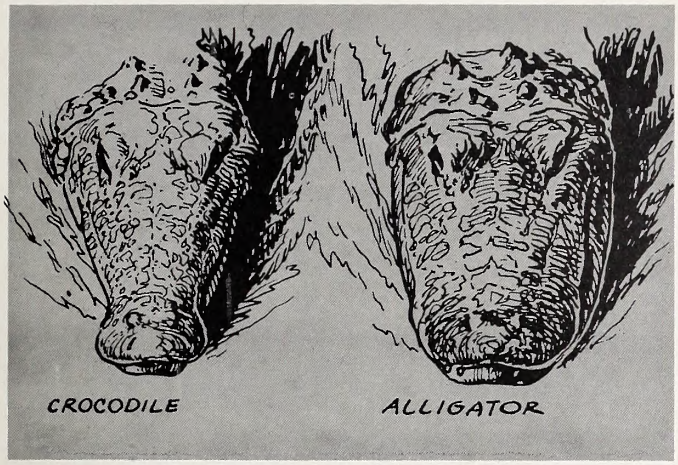


ILLUSTRATION BY BOB HINES

Carolinas, Georgia and Florida, west to Louisiana and Mississippi on to the Rio Grande in Texas.

Alligators and crocodiles are the "murderers" of the reptile family. Large alligators in the Reptile House of the New York Zoological Park have been known to battle for supremacy and in these contests several fatalities have occurred. Some of these occurrences are not of the criminal sort; but when a 12-foot alligator attacks and kills a 6-foot individual, entirely out of his class and far too small to fight with him, it is murder. An alligator will seize the leg of a rival and by violently whirling around on his axis, like a revolving shaft, twist the leg completely off.

The female is the aggressor in courtship and territorial defense. Males apparently spend much of the breeding season quarreling among themselves, roaring and fighting and injuring each other. The roaring attracts the females to the males, as does a musky secretion from the glands in the males' throat and cloaca.

The female makes a large nest-mound for the reception of the eggs. She scoops up mud in her jaws and mixes it with decaying vegetation. The mixture is then deposited on the nest site until a mound three feet high is made. The 15 to 80 eggs, which are hard-shelled, are laid in a depression in the top of the mound and covered with more vegetation. The female remains by the eggs until they are hatched in two to three months, incubated by the heat of the nest's rotting vegetation.

The hatching alligators peep loudly, and the female removes the layer of vegetation over the nest to help them escape. The young, when hatched, are eight inches long, weigh 1½ ounces and grow at the rate of approximately one foot a year, reaching maturity at six years and approximately nine feet.

The young feed on insects and on those crustaceans generally known as fresh water shrimp. As they grow older they eat frogs, snakes, fish, and turtles.

The enemy of ducks and other water animals, the alligator avoids man when possible and normally would not harm people. The food or animals are captured in their jaws or knocked down by their thrashing tail. They can move their head and tail sideways with great force and speed. The prey may be held under water until it drowns, then brought to the surface and swallowed whole above water. A ten-foot alligator can swallow ducks whole. They may "boom" when capturing food. Mature adults live mainly on fish but will catch muskrats and small mammals that go down to the water's edge to drink. They also take a certain amount of waterfowl. Very large alligators may occasionally pull larger mammals such as deer or cows down into the water and drown them.

Young alligators fall an easy prey to carnivorous fish, birds and mammals, and at all stages of growth they are attacked and eaten by large alligators. This kept the population steady.

But then came women's accessories made of alligator skin. As long as these are fashionable and high-priced, men will risk both the imprisonment, consequences of the laws passed to protect the alligators and the attacks of the alligators themselves.

There is also another commercial interest, detrimental both to the alligator and to the fashion industry. Baby alligator pets command a large market. Many caught for pet shops die in transit and affect the health of the others.

Another man-made destroyer of wildlife, land drainage, has seriously affected the alligator so that they are only safe in refuges where they cannot be harmed by "progress". And now, the refuges are threatened by redevelopment corporations and are fighting to survive as natural wilderness areas for wildlife.

In the 1971 General Assembly, the Legislative Report was amended to read: "It shall be unlawful to take or possess American alligators or their eggs at anytime, except that any bona fide zoo, either public or private, may, under a permit issued by the Executive Director of the Wildlife Resources Commission, possess such alligators and eggs for the purpose of display and/or propagation."

Alligator shoes and handbags, luggage and jewelry are no longer available in the United States. But in foreign countries, there is still a strong demand for these items. Unless there is world-wide wildlife control for the protection of endangered species, the alligator is doomed. The Wildlife and Federal undercover agents work relentlessly to arrest the poachers and other illegal operators, but they are far from being eliminated.

With no redeeming features or useful purpose, the alligator is not a champion in wildlife protection, as are the bald eagle and cougar. Steps must be taken to increase the policing of these swamp areas and to stiffen the penalty for poachers—before the American alligator follows the dodo bird into oblivion. ◆

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

More Courtesy Motorboat Examinations

Further announcement from the U. S. Coast Guard Auxiliary offers the following schedule for courtesy motorboat inspections:

May 12-13, 12 noon until 6 p.m., High Point's Oak Hollow Lake
May 13, 12 noon until 3 p.m., Raleigh's Lake Wheeler
May 19, 10 a.m. until 2 p.m., Lake Wheeler
May 20, 12 noon until 2 p.m., Lake Wheeler
June 2, 3, 9, 10, 12 noon until 6 p.m., Lake Burlington Marina, Burlington; Quaker Creek Marina, Graham; Pine Haven Access Area, Badin Lake; Southmont Access Area, High Rock; Newsom's Fish Camp. Tuckertown Lake; Pier 49, Mecklenburg Wildlife, South Fork Marina, York County Public Landing, all on Lake Wylie; Midway Marina, and Commodore Marina, Lake Norman
June 2, 10 a.m. until 2 p.m., Henderson Point, Kerr Reservoir
June 3, 10 a.m. until 2 p.m., Satterwhite Point, Kerr Reservoir
June 3, 10 a.m. until 2 p.m., Townsville Landing, Kerr Reservoir

Last Hunting Season Closes

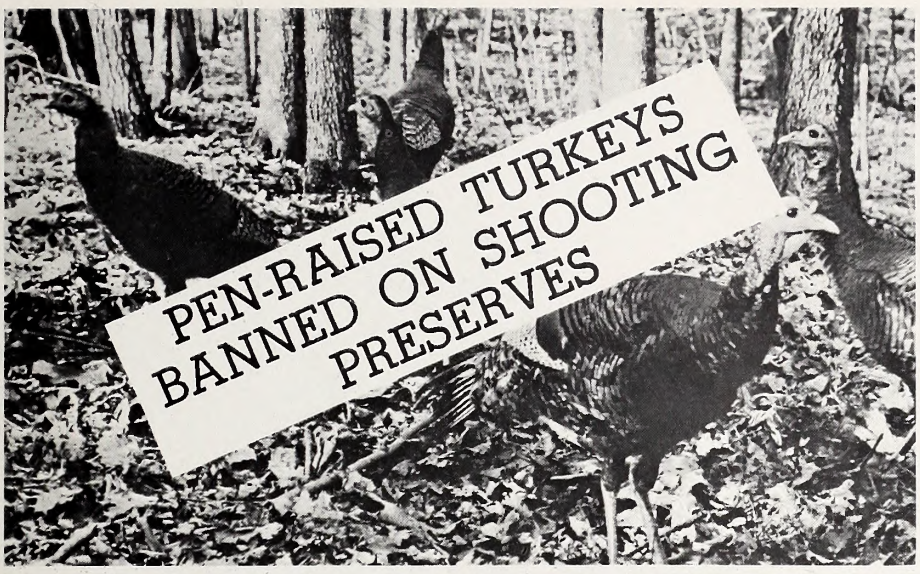
May 12 marks the closing of North Carolina hunting seasons which began last September 1 when dove hunting began. May 12 is the close of the spring gobbler season, which began April 21. Outdoorsmen will put their guns away for the summer and get out their fishing tackle.

Boaters Urged to be Careful

May begins the recreational boating season. With 61 fatal boating accidents last year, Tarheel boaters are urged to exercise caution and common sense. Boating accidents don't just happen—they are caused. Lack of proper lifesaving devices was the major cause of deaths on the state's waters.

Commission to Set Hunting Regulations May 14

After conducting a series of nine public hearings on proposed changes of the 1972-1973 hunting regulations, the Wildlife Resources Commission will meet May 14 to establish hunting and trapping seasons for the 1973-1974 seasons. Regulations on taking doves, waterfowl and other migratory game birds are established by the U.S. Fish and Wildlife Service. State regulations will be published and put in the hands of license dealers and Commission field personnel by August 1.



PEN-RAISED TURKEYS BANNED ON SHOOTING PRESERVES

by R. Wayne Bailey
Wildlife Biologist

On December 18, 1972 the Wildlife Resources Commission voted to ban the use of pen-raised wild turkeys on shooting preserves, an action recommended by the Surveys and Investigations Section of the Commission's Division of Game. The purpose of this article is to present the reasons for that move.

The problems involved in raising game birds in captivity and restoring them into the wild are as technical as any in the field of wildlife management. Thousands of pages have been written about them. Here we can only summarize the most important aspects as they pertain to turkeys; however, these aspects also apply to most birds, particularly to quail, ring-necked pheasants, and waterfowl.

Captivity greatly alters the physiology and behavior of any wild species. These changes result from two causes: (1) the direct effect of captivity and (2) the selection, intentional or unintentional, for traits enabling survival in the very unnatural conditions of captivity. Because of their inherent, intense, negative responses to humans, resulting in nearly continuous escape efforts, it is difficult and expensive to consistently raise pure wild* turkeys in quantity. In order to make the stock more manageable and profitable, early game breeders "tuned it down" or "tamed" it by mixing it with domestic turkeys. The domestic turkey originated in Mexico and has been greatly altered by centuries of "breeding", or selection, for domestic traits (a lack of fear of man and predators and a breeding cycle not fully in harmony with seasonal changes, characteristics in direct opposition to those necessary for survival in the wild). Hence, pen-raised turkeys are, at best, poorly adapted for survival in the wild. If survival does occur in an area where wild birds exist, interbreeding may result in the deterioration of the quality of the wild stock.

Perhaps the most important reason pen-raised wild turkeys imperil native populations is that clean, healthy wild birds can be infected by the diseased and parasite-loaded game-farm stock. This condition is prevalent in pen-raised birds because of the crowded, frequently unsanitary facilities in which they are held. Blackhead and other lethal turkey diseases are controlled on game farms by antibiotics. Once the birds are released, the disease-causing organisms are no longer under control and the birds may become carriers of these for some time before they die. During this period they can contaminate large areas of potential range and may cause disastrous epidemics in wild stock.

As a result of the twin hazards of genetic pollution (introduction of inferior traits into wild populations) and disease transmission, *numerous* declines have occurred in wild populations following the release of pen-raised turkeys. The release of pen-raised stock jeopardizes North Carolina's wild turkey restoration program and the established wild turkey populations that remain. No releases of live trapped, wild turkeys can be justified in otherwise suitable areas, where it is known that pen-raised turkeys are being released.

Since not all pen-raised turkeys released on shooting preserves are taken in the course of preserve hunting, those that escape into the wild present the aforementioned dangers. Thus, the Commission's recent ban is for the single purpose of protecting wild turkey populations and their ranges which are a valuable public resource. This ban is a step in the right direction but would be of much greater effect if applied statewide. Releases on areas other than shooting preserves are more dangerous than those made on preserves where many of the released birds are quickly killed by the gunning clientele. Therefore, it would be even better to prohibit the release of pen-raised or game-farm wild turkeys by anyone, anywhere in the state. Several states already have such a regulation. This action is needed in order to give the greatest reasonable protection to wild turkeys everywhere.

A ban on pen-raised turkey releases is particularly important to the six releases of live-trapped wild stock that have been made by the Commission in the last

• **continued on page 27**

*Most ads relative to pen-raised wild turkeys describe them as "wild" or "pure wild". In looks, stock closely resembles the birds as found in the wild, but its *behavior*, the critical factor in determining ability to reproduce and survive in the wild, is very similar to that of domestic stock.

The Role of the Hunter in Conservation

By Tyler Cox
Skyland

For the second straight year, Tyler Cox, a senior at T. C. Roberson High School, Skyland, has won first place in the N. C. Wildlife Federation's Essay Contest.

WHO knows better than the hunter the thrill of being outdoors on a crisp autumn morning when the clear, blue sky forms a backdrop for fleecy white clouds and the clean smell of autumn in the country penetrates and cleanses city-polluted nostrils? Add to this the excitement of bringing down a ring-necked pheasant of radiant colors and the beauty of the day is complete. The thrill and adventure of this sport is enjoyed by a person who has a vital stake in the future of his country's natural resources—the hunter.

Unfortunately, many people today are misinformed about the true ethics of hunting, mainly because of the anti-gun proponents and extreme preservationists who have managed to sell the entirely false notion that the harvest of wildlife is a crime against conservation. Since 1970 the anti-hunting movement has gained many converts, has mounted a powerful campaign of television and radio propaganda, and has

moved ahead to attack hunting frontally. The movement has deluded many people into the belief that hunting is not only cruel and wasteful, but is also the arch foe of conservation.

No other belief could be as false and misleading as this. On the contrary, the hunter is a most important advocate and vital supporter of conservation practices and wildlife restoration programs. In fact, the sportsman blazed the trail in resource conservation. The hunter has contributed three indispensable ingredients to conservation work—leadership, organization, and an unyielding demand that the outdoors be treated with respect. The hunter's real role in conservation is that he supports its many beneficial programs by paying taxes on the purchase of guns and ammunition and by buying hunting licenses and duck stamps.

According to the National Shooting Sports Foundation, hunters were actually the very first to decry the destruction of our country's forests, soil, streams, prairies, and wetlands. Sportsmen were the first to plead for conservation because they were the ones who saw what was happening to our natural resources. In fact these sportsmen were the only people who really cared (for over fifty years). When the news media would not give attention to hunters, they launched their own campaign to warn Americans of the environmental destruction. In order to provide funds for the campaign, the hunters asked to buy licenses and pay taxes on their equipment. This extra money was used to start the needed fish and game agencies in the United States.

Hunters even went one step further toward conserving our natural resources. They imposed hunting seasons and bag limits on themselves to help save and control wildlife. In addition, sportsmen were responsible for the formation and organization of important wildlife organizations in the United States. Groups such as the National Wildlife Federation, Ducks Unlimited, and the Izaak Walton League were formed to encourage and promote the wise use of all natural resources.

Today the nation's sportsmen are still acting to promote beneficial conservation practices and programs. Official tallies show that in 1971 alone sportsmen contributed over 256 million dollars to be used for the preservation and management of game and fish resources. This single year's contribution is more than the amount contributed by all other conservation organizations in the past decade. Obviously, hunters do indeed have a vital role in conservation.

Hunters deserve recognition for their outstanding efforts in keeping the outdoors attractive. In a recent study by Keep America Beautiful, Incorporated, it was found that of all categories of people using the outdoors, sportsmen were responsible for only five percent of the litter in the rural areas investigated. The largest blame for litter goes to picknickers and passing motorists.

Hunters also take a leading role in conservation by reporting fish kills. Since hunters often find themselves at the forefront of water pollution problems, many pollution-caused fish kills are first noted by them. Most hunters do take the time to bring such a situation to the attention of local conservation agents or public health officials.

A widespread belief today is that hunters cause the list of endangered species to grow. This is false, because American animals vanish through environmental destruction and mismanagement of natural resources and not from killing by hunters. Dr. Leslie Glasgow, former Assistant Secretary of the Interior for Fish and Wildlife, states, "The hunter and his harvest pose no threat to wildlife preservation. The single most important protection needed to perpetuate our wildlife is the preservation of its habitat." Dr. Glasgow also believes that a regulated game harvest, coupled with sound management practices, is not detrimental to wildlife populations. The harvest by hunters merely replaces losses resulting from disease, parasites, predators, and other natural causes.

A regulated harvest of game species prevents the waste of a resource. This is also the best way to control animal populations. An over-supply of animals leads to overbrowsing and consequent over-use and ruination of necessary food and cover. The resulting weakness in animals from malnutrition often brings on death from exposure or disease. In other words, if hunters do not harvest the game surplus, natural factors will.

The overkilling of a wildlife species today by regulated hunting is virtually impossible. On the other hand, game animals such as deer, quail, squirrel, and rabbit are more often threatened by underhunting than by overkill. It is also true that many game species are more numerous now than during the time of the Pilgrims.

English poet and satirist Alexander Pope once said, "The whole delight of the true sportsman is in the pursuit." This statement captures the real purpose of hunting. Sportsmen enjoy swift and cunning animals. Hunting provides the chance for one to test his ability to watch for game with a keen eye and to shoot quickly and accurately when a swift target whirs into the air from the tall grass.

The hunter does indeed have an important and needed role in conservation. As the early trailblazer in resource conservation, he formed game and fish agencies, organized many leading conservation groups, and imposed hunting seasons and bag limits to help control wildlife populations. The hunter's conservation work continues today because of his generous contribution of taxes used for conservation work and wildlife restoration programs. Let us hope that the hunter-conservationist will continue to help guarantee an abundance of wildlife and other valuable resources for the generations of tomorrow. ◆

Only a Fish

by R. Wharton Gaul, M.D.
Charlotte

THE earth trembled, and then its crust buckled under enormous subterranean pressures, creating massive wrinkles thousands of feet high. Extending from New England to Georgia, these masses came to be known as the Appalachian Mountains. And as millions of years passed, the rains and the winds wore them down until today they are only a fraction of their original height.

Then the ice came. Four times in the dawn of man's existence, the polar ice cap expanded southward until it covered New Jersey and southern Illinois and the region between. Marked changes took place among those creatures that were able to flee or migrate ahead of the freeze-up. In the frigid climate of the high Appalachians beyond the ice mass, only those creatures whose ancestors had evolved the ability to withstand cold could develop life habits compatible with the new climate. Among them was a fish.

In the clear cold springs of the high country there appeared a thing of beauty. Almost indistinguishable from its cousin, the arctic char, the brook trout has all the characteristics of a dweller of cold climes. It tolerates nothing but the cleanest, coldest, well-oxygenated waters of the mountains. **Salvelinus fontinalis,** the char of the fountain-heads, is its scientific name. Its back is dark green, its belly purest white. Tiny red spots punctuate its sides. Orange-red tips decorate the fins, and in the autumn of the year, the male takes on an orange hue that defies description, it is so beautiful.

By merely being there, the mountains attract rain. As the cloud masses pile up on the slopes, their moisture pours down upon a carpet of humus-rich soil which acts as a sponge, absorbing the water and holding it until it can filter into the depths of the earth. Heavy foliage protects the soil from the sun's heat, and the waters that leap forth from the springs are cool and clear. Here **Salvelinus** finds his home. Feeding upon a myriad of insect life, it is doubtful if even in late Pleistocene times he grew to heavy proportions. At least not in these parts. Old men of the mountains will tell you of taking baskets of brook trout as youngsters, but they seldom mention fish of large size.

And then came the logger. By ripping the forests from the mountains, the soil was destroyed, the waters warmed, and **Salvelinus** began to disappear. Only in a few high areas which the logger could not reach has he been able to survive mankind. And only as man began to see his own folly has there been hope for his return. Today he is somewhat protected in a few areas, but much of his habitat remains vulnerable to any lunatic with a bulldozer who sees a dollar to be made.

We found such an area. Cold sparkling water cascaded down a twenty foot fall to a deep pool. Overhead, old, old trees shaded the glen to a night-like darkness. The depth of the pool could not be determined. But if ever there was a place where **Salvelinus** would be at home, this was it. Most of his territory is too high for the waters to attain much depth or width, but here was one of those rare places. As far as we knew, man had not intruded his living habits upon the headwaters of this stream.

It was Al's turn to fish. Crouching low, he navigated the slippery rock to a position near the tail of the pool. From here he began casting, first to the near reaches of the water, and then gradually extending his casts towards the white water at the bottom of the falls. Nothing. We were puzzled. Surely somewhere in this stream there could be found a native brook trout of bragging proportions. But where if not here? No answer came. Later we encountered brown trout and even small brookies in other waters. But the puzzle remained.

A few weeks passed. I returned alone. Despite the rains that had fallen, the stream and especially the falls had

fallen to late summer lows. Our thundering friend of a month earlier was now a laughing ripple. The pools were shallower and if possible, clearer. I spooked one small speckled brookie of five or six inches as I made my way back to the glen. Following Al's plan, I crept up to the tail of the pool. Along the way, I managed to drop my fly box into the water. It flew open and there ensued the most remarkable fly hatch ever seen. By pure luck, most of the flies drifted into eddies where they were later retrieved. Selecting a Hendrickson from those flies remaining to me, I explored the pool. And saw him. Ye gods, what a fish!

No, he wasn't huge. But he was a large speckled brook trout, the largest native brookie I had ever seen. And he didn't want my Hendrickson. He ignored it as though it had never floated over his station. Puzzlement. What next? Well, two thoughts occur to the trout fisherman facing late summer low water. One of them would concern the large spider patterns such as old Ed Hewitt's Neversink Skater. Mine were somewhere downstream, emancipated from my fly box.

The other thought, based more upon brown trout fishing than what I was doing, concerned grasshoppers. It was the right time of year. And there was a -hopper with just a bit of red in the tail still in my pocket. Why not? I tied it on. First cast, nothing. Second cast three feet ahead of his feeding station. It was like a textbook rise. As it passed over him and entered his seeing window, he gave a slight flick of his tail. Drifting back as he surfaced, he suddenly lunged at the -hopper and smashed it. All I had to do was to hold on. Possibly a rainbow could make a better show. I doubt it.

After something of a dispute, he came to daddy. He was the loveliest fish I had ever cast my eyes upon. His belly was as thick as my wrist, and the speckles were bright scarlet. Only spawning colors could add to his beauty, and it was a month too early for that. Any further fishing that day would be an anticlimax.

I suppose any fisherman would want to tell a few friends about a fish like that. I told a few. By restraining myself, I only made one long distance call. Within a month I had stopped talking about it, mostly. After all, there is nothing that special about catching one little finny creature. It only took a massive upheaval in the earth's crust, plus an ice age to produce him. He's only a fish.

Wildlife Quiz Results

WAY back in December of last year, WILDLIFE IN NORTH CAROLINA presented a quiz to be completed by its readers. Each of the questions could be answered by researching the previous 11 issues of the magazine. The editors and author Charlotte Hilton Green sat back and held their respective breaths.

The response was immediate and quite good. Some trickled in and then the work of grading was put off due to other duties. There were 136 entries, over half of which missed only one answer, and few missing more than three. And there were 23 perfect papers. Now what to do with 23 "ties"? Well, after much anguish and deliberation, a drawing was decided upon. Each of the winners was assigned a number, the number placed on a one-inch square slip of paper and simply drawn out of a box. Right or wrong, this is the way the winners (four of them, instead of the originally-planned one) were selected.

Our congratulations to all 23 who took many hours researching the answers, and as somewhat of a consolation prize or co-first prize, we're sending all the winners a limited edition print of a striped bass, signed by artist Duane Raver, and a year's subscription to WILDLIFE IN NORTH CAROLINA. To the selected top four winners goes a copy of Robert Murphy's **Wildlife Sanctuaries,** valued at $22.50.

We wish to thank everyone who entered, and hope that they profited by the work they did on it. The question that proved the downfall of most of those that missed one or more was number 22, "What is the only species whose habitat includes the earth's poles and tropics, deserts and jungles, swamps and mountaintops?" The answer: Man. Sorry 'bout that.

First-Prize Winners

Johnnie L. Fox
Goldsboro, N. C.

Billy Felton
Eure, N. C.

Willie M. Byrd
Raleigh, N. C.

Betty R. Ford
Hickory, N. C.

Consolation Winners

James S. Ridgeway
Pensacola, Florida

Donald F. Maner
Winston-Salem, N. C.

M. Kenneth Tew
Durham, N. C.

Spencer Etheridge
Tarboro, N. C.

Wildlife Quiz Winners

All Perfect Scores

Mrs. John D. Champion, Jr.
Fuquay-Varina, N. C.

Bobby D. McCullum
Clarkton, N. C.

Danny Comer
Seagrove, N. C.

Pete Brendle
Cleveland, N. C.

Tim Fasolt
Smithfield, N. C.

Ricky Harris
c/o Outdoor Recreation Class
North Iredell High School
Room C-104
Olin, N. C.

Mr. and Mrs. S. D. Sparrow
Belhaven, N. C.

Richard F. Gainer
Greensboro, N. C.

Mrs. Helen P. Hardin
Brevard, N. C.

Virginia K. Abernethy
Charlotte, N. C.

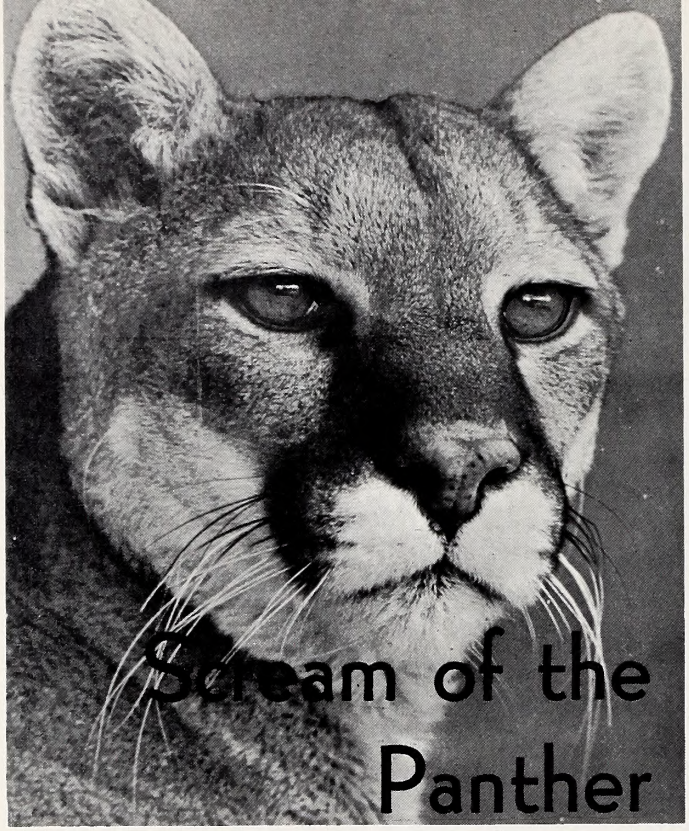
Elmer W. Cook
Northfork, West Virginia

Ilse F. Soderberg
Fayetteville, N. C.

John Ritchie, Jr.
Greensboro, N. C.

Daniel J. Antion
Albemarle, N. C.

Rodney M. Wren
North Miami Beach, Florida



Scream of the Panther

"Here we go again," you say. Well, maybe, but this time hear it from one who has been there.

By Leeming Grimshawe
Flat Rock

"HIT'S the truth, I tel you, a panther is using, right here in the cove." This was the year 1905; my father and I had come to ask our neighbor, Charlie Edwards, about the report that a mountain lion had been heard to scream behind his house up under Black Rock Mountain. If it was a panther that someone had heard scream, the chances were that it had made a kill and it was calling for its mate to come and join in the feast. Our plan was to ask Charlie to join us with his dogs. With two packs of dogs we could cover the whole country and if our dogs picked up the scent of a panther, they would indicate their fear by growling, yelping, and the hair on the back of their neck would rise up. Again, that day we found no trace of a mountain lion. All winter long we investigated every account whenever someone had heard what they thought was panther scream.

My father was taking no chances. We had a flock of sheep grazing in three different pastures. Should a panther discover one of these flocks the chances were that it would injure or kill every sheep in the pasture.

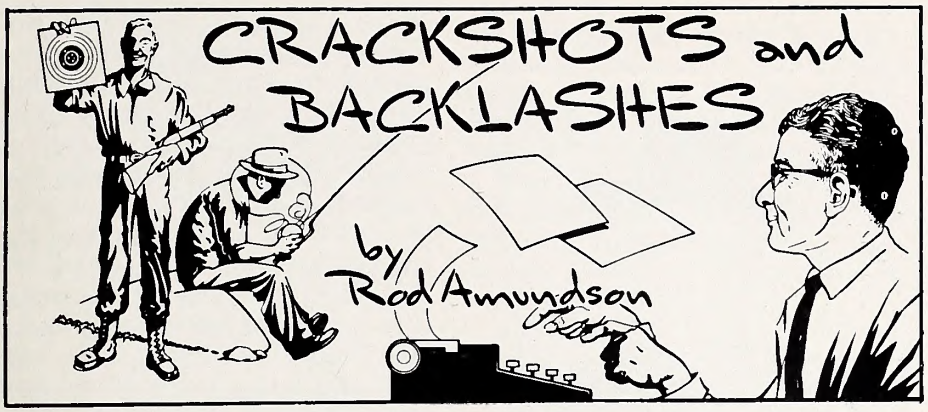
One day our mail carrier brought the news that an animal had killed some sheep in the rough and very rugged mountains near Horse Cove. This animal, whatever it was, had dragged its kill into a sandy place in the road and covered its head with brush and leaves. This is the trick a wildcat does when it makes a kill, but no wildcat was ever large enough to drag a full grown sheep into this place. The owner of these sheep heard some of them bleating at daylight and went to investigate. He found this dead sheep in the road and spread the news; every hunter in the whole neighborhood brought their dogs to look for the animal. One pack of hounds followed the scent some distance, but that mountain lion was miles away by the time they started hunting.

This news seemed to be our first definite proof that a mountain lion had ever been discovered in our mountains. No one had heard this animal scream. There was no indication that it had been around there for a few days before it made its kill.

Felis concolor, known locally as a mountain lion or panther is a far ranging, elusive animal that carefully avoids contact with human beings. They are a widespread secretive animal around which many mysterious legends have developed. Many people hold them with suspicion and fear. They are supposed to carry away sheep, pigs and even babies. Few people have ever seen one, but those who have heard what they thought was a panther scream, are many. When a country boy wants to scare a couple walking home after dark, he screams like a panther. If a bootlegger wants to scare some coon hunters away from the vicinity of his still at night, he screams like a panther. When young people are together and they start home at night, someone mentions the fact they might meet a panther. The boys tell the girls, "You are so pretty a panther would carry you off." The girls tell the boys, "Shucks! You can't run fast, they'd catch you." To which the boys reply, "I'm so blamed ugly, if a panther did catch me in the dark, he'd turn me loose at daylight."

At one time mountain lions were everywhere. They were the most widely distributed of all American mammals. We know that there still are some in our swamps and in many wild mountain areas in the west, but do they scream or call to each other? I have a letter from Elliott S. Barker, state game warden, Department of Game and Fish, Santa Fe, New Mexico. In response to my letter of inquiry, he wrote: "One just does not see mountain lions, even when they are plentiful. I have hobnobbed, more or less, all my life with lions, and have seen only two except in front of my dogs. The lion does have a rather low whistle-like call which I think is a kind of 'keep together.' That and the hissing, spitting that a lion makes when fighting dogs are the only sound I have ever heard." Mr. Barker goes on to say: "I omitted any reference to the scream of a mountain lion in my book, simply because I have never heard one scream, nor have I ever talked to an old lion hunter who has definitely heard one."

We are now looking for facts; I am not interested in other people's opinion. Does a mountain lion ever scream? Some day a tape recording may be made of a mountain lion's scream. It is possible that one caught in a trap may call to its mate? Foxes do this. Wildcats do this and many other wild animals call to their mates when in distress. In the past few years, wolves have come in for much study. Scientists have made a thorough study of them. We can now hear a tape recording of their howls. But what of the panther?



Is the Sportsman to Blame?

The focus on environmental affairs in recent years has brought many concerned citizens into contact with issues that appear to have simple, straight-forward solutions when, in fact, the issue is very complex. Take endangered animal species, for instance. As the list of endangered species grows and some of the endangered join the ranks of the extinct, there is the tendency to place the blame on a single factor — the hunter.

The commercialism which marked the decline of the snowy egret for plumes and the passenger pigeon for meat, the poaching of rhinos for their horn and tigers for their fur has often been linked with the sportsman-hunter. The sportsman who takes game legally, however, is part of an environmental management program. He is the same sportsman who has long been a leader in financing programs of research and management to protect endangered species and their environment.

Unfortunately, some environmentalists, in their zeal to halt the decline of certain animal species, have wrongly pointed the finger at the hunter as the culprit. Hunting is only part of the picture. Decline of animal species through changes in or loss of habitat or food supply brought about by Man's development of the land has much greater impact than control by hunters. Some people with good intentions overlook the important fact that animal species which cannot withstand harvesting are protected by state and federal laws.

"Say Goodbye," a 52-minute movie produced by David Wolper and the Quaker Oats Company in 1970, called the attention of millions to the plight of many endangered species through a nationally televised special program. The film, now available for rent and being used in schools throughout the country, uses sensationalism and outright deceit to make the point, for instance, that hunters wrongfully decimate polar bear numbers. The scene of a mother bear shot with a sedative-containing dart from a helicopter as part of a polar bear management program by the Alaska Fish and Game Commission is made to appear as a typical hunting venture as two helpless cubs look on.

Information and Education Division
Michigan Dept. of Natural Resources

Too Many Bass Killed

Dear Sir:

Let me begin by saying how much I have enjoyed "Wildlife in North Carolina". Over the years this magazine has been very informative to the people of our state. This letter is in regard to the rapidly increasing fishing pressure on our lakes, especially bass fishing and what can be done to partially alleviate this problem. With the new scientific concept of bass fishing that involves Depth Sounders, Thermometers, Barometers, and topographic maps, fish are being taken out of lakes in large numbers. Most of these fish are being used for the purposes of display and reputation rather than for eating. As a member of the Bass Anglers Sportsmen Society, a Professional Tournament Fisherman, and a Guide on Kerr Reservoir, I have become quite concerned. Many of my friends who are members of State Bass clubs have also become concerned. We feel that the public should be made aware of our attempts to conserve our bass population.

Our National Tournament slogan is "Don't Kill Your Catch"; fish caught are placed in aerated live wells in the tourament boats and are released alive after being weighed. Our average has been around 90% on fish saved. Our enjoyment is fulfilled when the fish are boated not when they are displayed on a stringer to impress someone. If a fisherman wishes to really enjoy his catch, a camera will suffice. Many of the bass clubs around the state have adopted this new release concept. However, we need more statewide coverage. We feel that the average weekend fisherman is not aware of the danger facing our fish population. Our goal is to embarrass the majority of fishermen coming into the landings with large stringers of dead fish, merely to impress someone.

Sincerely,
Charlie J. Stevens
Durham

High Fox

Dear Sir:

A few years ago I wrote you about our group of foxhunters finding and seeing an egg drop from a quail in February. Now I have another unusual event that seems way out of the ordinary to me.

On the McAllan estate just east of Rowland, North Carolina, during the first bad sleet storm—about January 15th (while sleet completely covered the ground), an Indian lad heard a noise in a squirrel bed. He was taken by complete surprise when out tumbled a female grey fox after shooting into this 10-to-12 high bed.

Being interested in all outdoor life all through my 63 years, I am constantly when out in the woods reminded of the sense of

our so called "dumb animals". Maybe we are often the dumb animals ourselves.

Thought this might be of interest.

J. Wilton Lewis
Fairmont, North Carolina

• In Mr. Lewis' letter about the quail egg, the egg dropped from a bird in a covey inadvertently flushed by the fox hunters or their dogs. As to the female grey fox tumbling out of a "10 to 12 high" squirrel bed, the editors assume the "bed" to be a hollow tree with the opening 10 to 12 feet above the ground, rather than a 10-to 12-inch squirrel nest in a tree. In local terminology, the word "bed" often refers to a nest. It is doubtful that a mature female grey fox would be comfortable in a squirrel nest only 10 or twelve inches high.

So-called "dumb animals," we agree, aren't so dumb! Ed.

KNOW YOUR PROTECTOR

Ralph R. Griffin

Wildlife Protector Ralph R. Griffin, stationed at Wadesboro in Anson County, was born January 20, 1921. He is the son of the late Mr. and Mrs. H. Wilson Griffin of Wadesboro. Ralph graduated from Deep Creek High School in Anson County.

Prior to employment with the North Carolina Wildlife Resources Commission, he was employed by the North Carolina Ship Building Company, Wilmington, North Carolina. On September 15, 1950, Ralph was appointed Wildlife Protector and stationed in Anson County. He completed the Basic School for Wildlife Protectors at the Institute of Government at Chapel Hill, North Carolina, in 1951, and since his initial employment has completed five In-Service Training Schools. Mr. Griffin is a member of the Southeastern Association of Game and Fish Commissioners, Law Enforcement Section, the North Carolina Police Volunteer Benefit Association, the North Carolina Association of Wildlife Law Enforcement Officers and the White Store Wildlife Club.

The Griffins have two daughters and one son and attend the Mount Olive Baptist Church.

BOOKS *for the Sportsman*

FISHLESS DAYS, ANGLING NIGHTS by Sparce Grey Hackle (Alfred W. Miller). Crown Publishers Inc., New York, 1971.

For a number of years now, Sparce Grey Hackle's **Fishless Days,** originally published in 1954, has been out of print. It is a pleasure to discover this new and updated version which however still contains the gems of the earlier edition. Through his membership in the Brooklyn Flyfishers, Miller came to know many of the greats of American trout fishing as well as having the opportunity to fish a number of the traditional trout waters of the New York-Pennsylvania area. His book contains something for everyone who casts the fly over sparkling waters. For the purist there is a chapter on The Perfect Angler. For the angler-historian, the section on the quest for Theodore Gordon's grave contains much new material on this pioneer of American trouting. For the humorist, the identification of Sparce Grey Hackle himself should provide an irreverent chuckle or two. This book belongs in every angler's library.

R. Wharton Gaul

This past Christmas, my wife gave me two books. I have read many books on flies and fly-tying and collected some of the important ones, but nothing in my library is comparable to either of these.

The first is Ernest Schwiebert's long-awaited NYMPHS. Published by the Winchester Press of New York at a price of $9.95, it is more or less a companion piece to Schwiebert's MATCHING THE HATCH, published some 20 years ago. MATCHING THE HATCH was innovative and thorough, and it may have led more serious American trout fishermen to the gates of fanaticism than any other single book previously published on trout fishing. In it is a description of every major mayfly, stonefly, and caddis along with their habits and range. There were also color plates of many of the flies. But MATCHING THE HATCH was largely concerned with adult flies (dry flies).

NYMPHS, of course, deals solely with the subsurface forms of stream insect life before they leave the water. I believe NYMPHS is a more important book than MATCHING THE HATCH. For one reason—perhaps the best—trout feed far heavier on subsurface insect life in the nymphal stage than they do on adult flies (dry or floating). Also, no one heretofore has ever researched and catalogued the multitudes of nymphs so completely as has Schwiebert in this book. If NYMPHS does not shape the future of trout fishing in America, I will be greatly surprised.

Those familiar with MATCHING THE HATCH are in for some pleasant surprises when they pick up NYMPHS. Most important, the color illustrations—drawn by Schwiebert—are far superior to those found in MATCHING THE HATCH, both in terms of skill and reproduction, and each illustration is keyed to a description of the insect and a description of the proper matching fly pattern. The fly patterns give hook sizes and a list of materials. Also, the range and habits of the natural flies are discussed. Schwiebert's writing style, though still direct, seems less stiff and formal, and in spite of the incredible mass of detailed information, the book is more entertaining to read than MATCHING THE HATCH.

Perhaps the most telling compliment was the reaction of Don Baker, who is the North Carolina Wildlife Resources Commission's Chief of the Division of Inland Fisheries. When he saw it, he decided to order one for use by his biologists. The book is that good.

The second gift was Art Flick's MASTER FLY-TYING GUIDE, published by Crown Publishers, Inc., of New York at $10 a copy. Like NYMPHS, it is a book largely designed for advanced fly tyers. The first thing you notice about this book is the superior black and white close-up photography of a variety of flies. Many of the photos are arranged to show step-by-step construction.

Every basic type of fly is covered in the book, and experts in each type handle the chapters. For instance, Helen Shaw discusses streamers, bucktails and bass flies, while Art Flick's chapter is on dry flies. Doug Swisher and Carl Richards have a chapter on their flies, including their no-hackle concept. Ernest Schwiebert handles salmon flies and Ed Koch tackles terrestrials and midges.

There is even a fine chapter on salt water flies which is ably written by Lefty Kreh who is not only a superb fisherman, but one of the finest fly casters in the world.

Ted Niemeyer's chapter on nymphs and wet flies and Dave Whitlock's chapter on western fly patterns were particularly interesting, largely because these two tyers are such exacting craftsmen. Whitlock also has a very informative chapter on new tools and materials for fly tyers.

Quite frankly, reading this book was a humbling experience. I have been tying flies since I was 12 years old, but I learned new things in every single chapter.

I have indicated that Art Flick's MASTER FLY-TYING is for advanced fly tyers, but it can also be a valuable asset to the beginner. A teenage boy next door has just begun to tie flies, and he borrowed the book as a reference. Within two weeks, he had mastered some of the most difficult patterns and is well on his way to being a real expert.

Who knows, maybe one day Flick will compile a sequel to this book, and my young neighbor may even write one of the chapters. ⬍⬍

Jim Dean

• **TURKEYS continued from page 19**

three years. (See Wildlife in North Carolina, January, 1973, page 21; and July 1972, page 11.) As these populations increase, affording additional sources for transplant stock as well as hunting opportunities in spring seasons, the Commission's turkey restoration program can be considerably accelerated. With proper management and with public support of the regulations governing turkeys, we can, in the future, enjoy hunting them in many places in the state not now providing such opportunity.

The individuals and organizations who have made or are conducting releases of pen-raised turkeys are, of course, well-intentioned. It is painful to have to inform them that their commitments of effort and money are not only wasted but counter-productive in terms of their own objectives as well as the public good. It is indeed sad that artificially-raised game birds are not the answer to the restoration of huntable populations. Were it so, good turkey populations would have long ago been established in all suitable ranges.

Scientific advancements in wildlife management have revealed the counter-productive effects of releasing pen-raised turkeys. In the best interest of a continuing wildlife program based on sound and progressive wildlife management principles, the Wildlife Commission asks North Carolina sportsmen and wild turkey enthusiasts to support this effort, which is designed to point out the serious threat of pen-raised stock to the wild turkey restoration program. ⬍⬍

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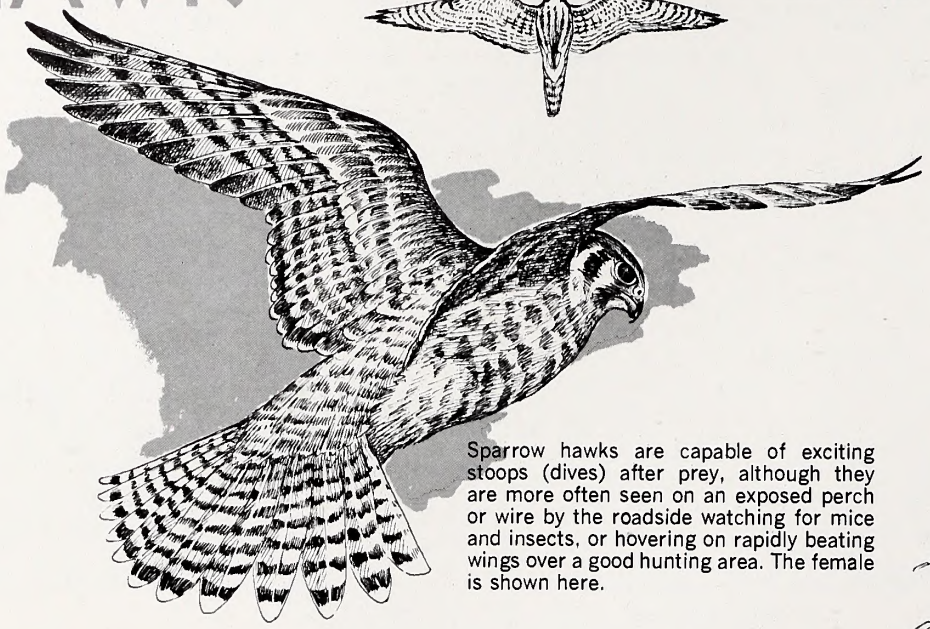
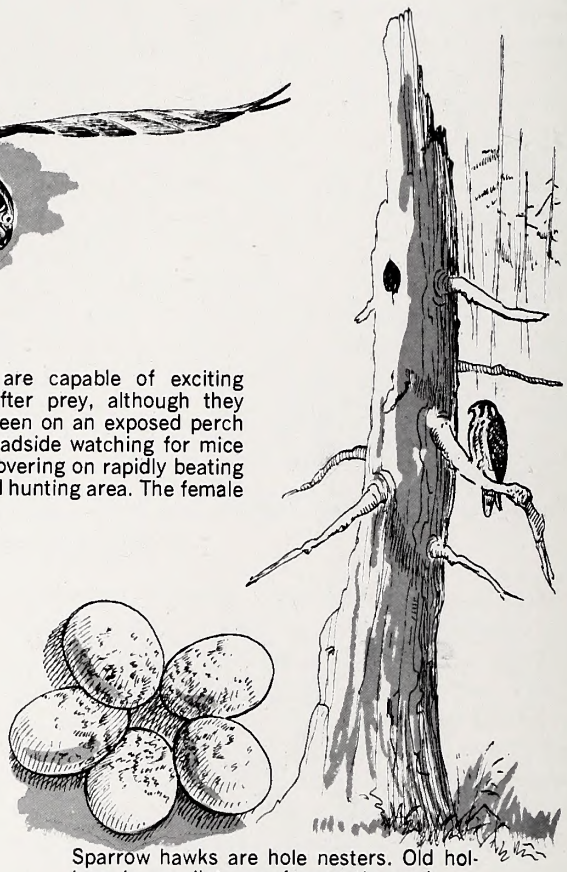
SPARROW HAWK

Sparrow hawks are robin-sized. They possess the long pointed wings of true falcons, as well as their fantastic flying abilities.



Sparrow hawks are capable of exciting stoops (dives) after prey, although they are more often seen on an exposed perch or wire by the roadside watching for mice and insects, or hovering on rapidly beating wings over a good hunting area. The female is shown here.



Falcons are equipped with a "toothed" beak, and our sparrow hawk is no exception. This tooth enables the falcon to quickly and efficiently kill its prey by severing the spinal cord.

Major prey species are large insects and small mammals. During nesting season, sparrow hawk families consume enormous quantities of grasshoppers and mice.

Sparrow hawks are hole nesters. Old hollows in woodlots are frequently used . . . as well as barn lofts and deserted buildings. Usually three to five ovate-shaped eggs are laid (sometimes seven). The eggs are white or light brown with darker brown markings.

Sparrow hawks have adapted well to the encroachment of humans upon its habitat. They may be seen almost anywhere along country roads near towns, and farms. These small falcons may even be enticed to make their nest in a home-made nesting box. Our most plentiful and beautiful little hawk should be cared for and encouraged. In beauty and economic benefit to all of us, the sparrow hawk is a definite asset.

R. JENKINS

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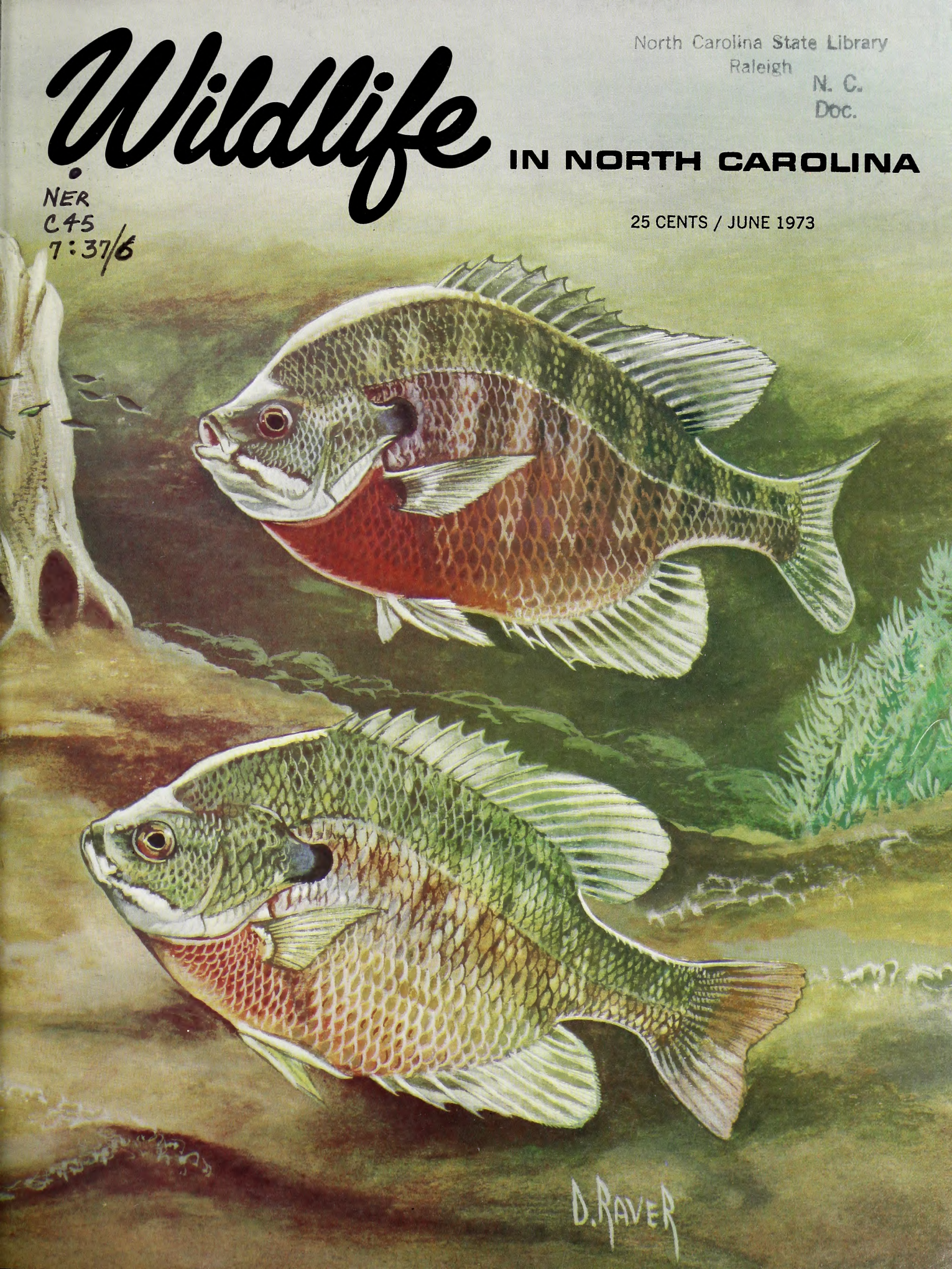

PHOTO BY W. A. MURPHY

Is This Yours?

Although some of this mess along one of our reservoirs is of a "natural" nature, logs, sticks, etc., there are plenty of man-deposited items pitched overboard or dumped from the shore. We as sportsmen have an added responsibility of keeping such areas clean and habitable.

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JAMES E. HARRINGTON, JR.
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WILDLIFE N NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefuliy receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for ali materiais published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raieigh, N. C.

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Second class postage paid at Raieigh, North Caroiina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 99,391

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII. NO. 6 JUNE, 1973

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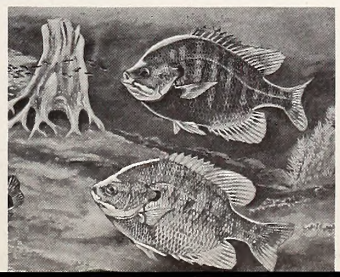
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



This underwater scene depicts a pair of bluegills ready to dine on a school of bass fry. Papa bass may have another opinion. The yellow bullhead is only mildly interested. Farm pond management is tricky business as most pond owners and biologists will tell you. These waters can provide some fine fishing.

A Look At North Carolina's Endangered Wildlife

Part 1

by Dr. Rowland Shelley
Raleigh

FOR the past year, an Endangered Species Committee of the Department of Natural and Economic Resources, comprised of biologists from state and federal agencies and universities, has been compiling a list of endangered plants and animals in North Carolina. A number of specialists outside the state, particularly in the federal Office of Endangered Species, were also contacted to obtain advice on habitat conditions and status within the state. These species could be especially useful as living monitors of environmental quality within North Carolina, and periodic revisions will be necessary to keep the list up to date. In addition, a bill providing for protection of these species and for public input to the list has been prepared and will be introduced into the legislature, and it is hoped that it will be enacted into law. Ultimately, however, protection of these species is dependent upon preservation of their habitats. Thus a close watch must be kept on the various North Carolina ecosystems.

The status of these species in North Carolina is based on the following federal criteria which have been adapted for state use:

Endangered: An endangered species or subspecies is one whose prospects for survival are in immediate jeopardy. Its peril may result from one or many causes —loss, change, or destruction of habitat; overexploitation; predation; competition; disease; etc. An endangered species must have help, or extinction and/or extirpation from North Carolina will probably follow.

Rare: A rare species or subspecies is one that, although not presently threatened with extinction, is in such small numbers throughout its range that it may be endangered if its environment worsens. Close watch of its status is necessary.

Undetermined: An undetermined species or subspecies is one that has been suggested as possibly endangered, but about which there is not enough information to determine its status. More information is needed.

Peripheral: A peripheral species or subspecies is one whose occurrence in North Carolina is at the edge of its natural range and which is rare, endangered, or undetermined within North Carolina although not necessarily in its range as a whole. Special attention is necessary to assure retention in our state's fauna.

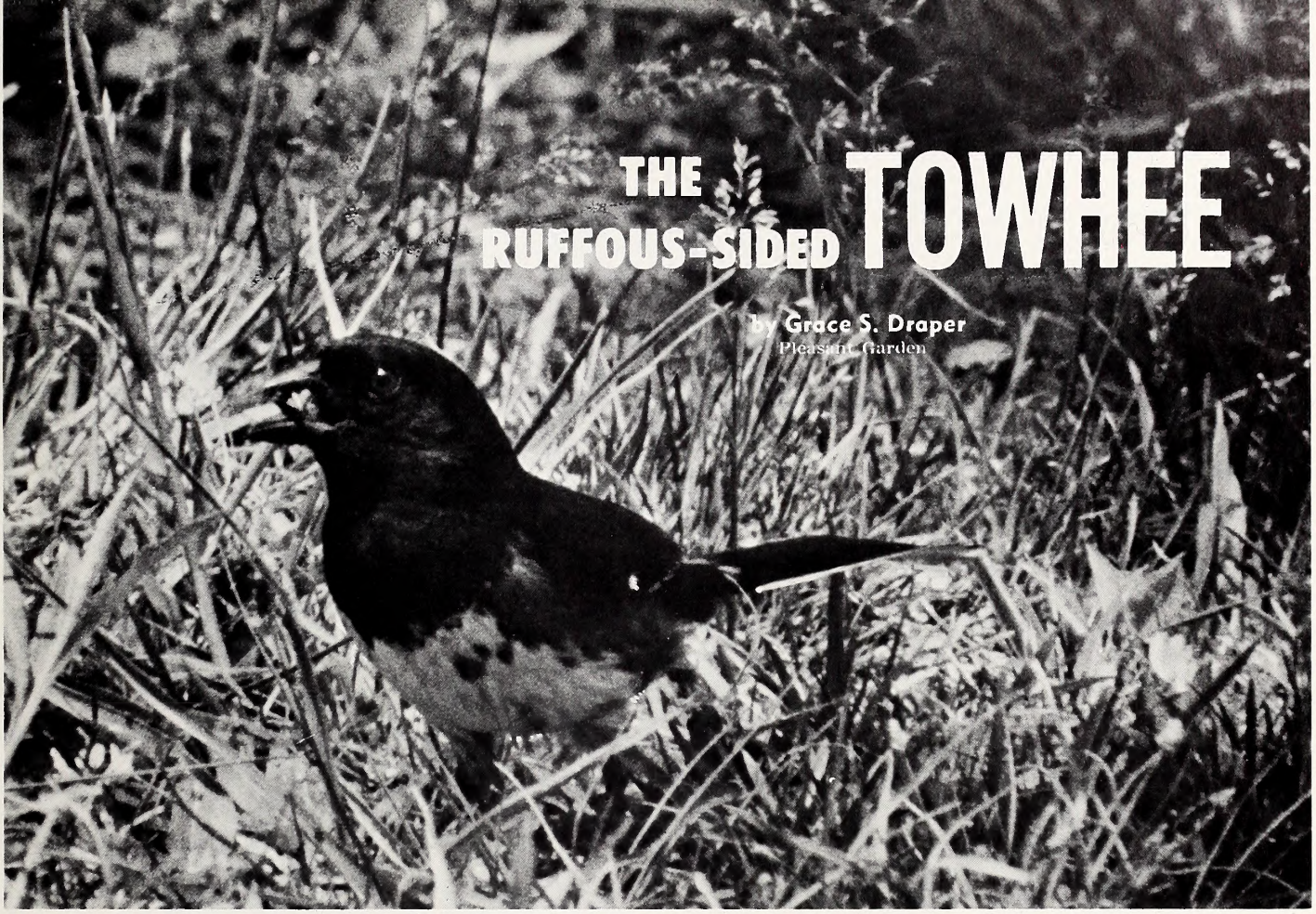
The list of endangered species for North Carolina includes one earthworm, one aquatic "earthworm", one freshwater sea worm, two leeches, two small crustaceans, five crayfish, a dragonfly, a scorpion fly, a tiger beetle, four moths, a bee, one fly, twenty millipedes, one spider, the scorpion, six bivalve mollusks, three aquatic snails, and thirty-eight land snails. Coming up the animal scale, there are listed nine salamanders, one waterdog, a mudpuppy, and four frogs. Reptiles include five sea turtles, a skink, a water snake, the alligator, bog turtle, a softshell turtle, the coral snake, and eastern diamondback rattlesnake.

Birds, mammals and plants will be discussed in subsequent issues of WILDLIFE. Endangered fish are listed here.

Species	Range In N.C.	Preferred Habitat	General Comments	Projects Affecting	Status
Acipenser oxyrhynchus Atlantic sturgeon	Below lock #1 on Cape Fear & coast from Cape Fear to Drum In.	Sandy-mud bottoms at sea	No fish under 6' should be kept Depleted		Rare
Acipenser brevirostrum short-nose sturg.	1 recent record from Albemarle Sound		Possibly extirpated from N.C.		Endangered
Acipenser sp.	1 record, French Broad, Hot Spgs.				Endangered
Etheostoma mariae-Pinewoods darter	Sandhills region Lumber river		Endemic	Possible channelization projs. SCS.	Endangered
Semotilus sp. Creek chub	Lumber R. Sys.		Endemic	Possible channelization projs. SCS.	Endangered
Ethesotoma perlongum Waccamaw darter	L. Waccamaw Columbus Co.		Endemic	Spraying herbicide, silvex, in canals of lake.	Endangered
Fundulus waccamensis Waccamaw killifish	L. Waccamaw Columbus Co.		Endemic	Spraying herbicide, silvex, in canals of lake.	Endangered
Menidia extensa Waccamaw silverside	L. Waccamaw Columbus Co.		Endemic	Spraying herbicide, silvex, in canals of lake	Endangered
Notropis mekistocholas Cape Fear shiner	4 streams near confl. Haw & Deep rivers	Slow, clear streams.	Endemic	Possibly New Hope Dam	Endangered
Noturus furiosus Carolina madtom	Neuse & Tar River systems		Endemic	Falls, Wilson Mills, Grey Rock, & Spg. Hope Dams, & channs. in these systems.	Endangered
Noturus sp. (leptacanthus type). Madtom	Waccamaw & Cape Fear R. Sys.	Gravelly riffles, runs on coastal plain	Apparently rare		Undetermined
Moxostoma ariommum Bigeye jumprock	Roanoke R. Sys.	Riffles & Runs, Clear bottoms		Walnut Cove, Martin, Mayo, & Schoolfield Dams.	Endangered

Species	Range In N.C.	Preferred Habitat	General Comments	Projects Affecting	Status
Etheostoma podestemone Riverweed darter	Roanoke R. Sys.	Riffles, usually moderate size stream. higher gradient area.	Endemic, not on lower pied.	Walnut Cove, Martin, Mayo, & Schoolfield Dams.	Endangered
Etheostoma c. collis. Carolina darter	Catawba & Yadkin R. Sys.	sluggish or still water, quieter streams		Morganton, Lincolnton Dams & some of 15 dams on Yadkin	Rare
Etheostoma collis lepidinion Carolina darter	Lower pied. Cape Fear, Neuse & Roanoke R. Sys.			Falls, Wilson Mills, New Hope, Howards Mills Dams.	Rare
Hypentelium roanokense Roanoke hogsucker	Roanoke R. Sys.	Riffles & Pools	Endemic to Roanoke dr., N.C. & Va.	Walnut Cove, Mayo, Martin, & Schoolfield Dams.	Rare
Etheostoma thalassinum Seagreen darter	Broad & Catawba Rivers		Common	Clinchfield, Greater Gaston Shoals, Morganton, Lincolnton Dams.	Undetermined
Ambloplites cavifrons Roanoke bass	Scattered recs. pied. Tar & Neuse drs.	pools		Dams on pied. Tar & Neuse	Undetermined
Notropis scabriceps New R. shiner	New R. sys. above Falls of Kanawha		Common Endemic	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Phenacobius teretulus Kanawha minnow	New R. Sys.	larger streams clear bottoms	Uncommon Endemic	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Nocomis platyrhynchus Bigmouth Chub	New R. Sys.	pools & Riffles, large strs., clear bottoms	Common Endemic	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Parexoglossum laurae-Tongue-tied minnow	New R. Sys.	pools, moderate larger streams, clear bottoms	Uncommon	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Pimephales notatus-blunt-nose minnow	New R. Sys.	pools, good tolerance to turbidity. Mod. foliage streams.	Common in New, introduced as bait elsewhere	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in New
Etheostoma kanawhae Kanawha darter	New R. Sys.	Riffles; Moderate foliage streams	Common Endemic	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Percina maculata Blackside darter	New R. Sys.	Pools of moderate & larger streams.	Common	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Percina oxyrhyncha Sharpnose darter	New R. Sys.	Riffles, larger streams	Rare endemic, rare throughout New system	Blue Ridge Dam Site 78 Dam	Peripheral-Endangered in N.C.
Polyodon spathula paddlefish	French Broad R. Sys.	big rivers			Peripheral-Endangered in N.C.
Hiodon tergisus mooneye	French Broad	big rivers			Peripheral-Endangered in N.C.
Esox masquinongy Muskellunge	French Broad Little Tennessee	big rivers			Peripheral-Rare in N.C.
Hybopsis monacha Spotfin chub	1 record, Nolan Crk. Little Tennessee	riffles, runs, larger rivers	Possibly extirpated.		Peripheral-Endangered in N.C.
Carpiodes carpio River carpsucker	French Broad				Peripheral-Rare in N. C.
Ictiobus bubalus smallmouth buffalo	French Broad				Peripheral-Rare in N.C.
Moxostoma carinatum-River Redhorse	Little Tennessee, French Broad, & Hiwassee	Clear bottom rivers			Peripheral-Rare in N.C.
Noturus eleutherus Mtn. madtom	1 record French Broad	Riffles, clear bottoms, larger streams			Peripheral-Endangered in N.C.
Pylodictis olivaris flathead catfish	New R. Sys. & Tennessee dr. (not reported Watauga, Pigeon)	Riffles, clear bottoms, larger streams.		Blue Ridge Dam Site 78 Dam	Peripheral-Rare in N.C.

Species	Range In N.C.	Preferred Habitat	General Comments	Projects Affecting	Status
Percina aurantiaca-Tangerine darter	Large streams, Tennessee R. Sys.	Confined to deep riffles, juvs. often in shallows			Peripheral-Rare in N.C.
Percina burtoni Blotchside log perch	French Broad & Toe	in or near riffles larger, clear strs.			Peripheral-Endangered in N.C.
Percina caprodes log perch	French Broad	larger streams	1 collection in N.C.		Peripheral-Endangered in N.C.
Percina macrocephala Longhead darter	1 record, French Broad	sluggish sections larger streams			Peripheral-Endangered in N.C.
Percina squamata Olive darter	French Broad, Toe, & Hiwassee	Near riffles, often among boulders, larger streams			Peripheral-Rare in N.C.
Percina sciera Dusky darter	1 record French Broad	sluggish parts, larger streams			Peripheral-Endangered in N.C.
Stizostedion canadense-Sauger	French Broad	larger streams			Peripheral-Rare in N.C.
Etheostoma acuticeps-Sharphead darter	1 record, North Toe river	very swift, clear riffles, larger strs.	Probably extirpated in N.C.		Peripheral-Endangered in N.C.
Etheostoma jessiae Blue-side darter	Known in N.C. only Mills R. French Broad	sluggish, soft bottoms areas			Peripheral-Endangered in N.C.
Etheostoma maculatum vulneratum spotted darter	1 record, French Broad, 4 records Little Tennessee	in or near riffles, adults usually under large rubble, larger streams.			Peripheral-Rare in N.C.
Etheostoma camurum-Bluebreast darter	1 record, Pigeon River	Swift riffles of larger streams			Peripheral-Endangered in N.C.
Micropterus punctulatus spotted bass	Uncommon in French Broad & Hiwassee	pools			Peripheral-Rare in N.C.
Aplodinotus grunniens freshwater drum	1 record, French Broad	larger rivers			Peripheral-Endangered in N.C.
Nocomis leptocephalus interocularis Bluehead Chub	Savannah, Chatooga Horsepasture, & Toxaway Rivers	ubiquitous, small to moderate streams			Peripheral-Undetermined in N.C.
Hybopsis rubrifrons Roseyface Chub	Savannah, Chatooga, Horsepasture, & Toxaway Rivers				Peripheral-Undetermined in N.C.
Micropterus coosae Redeye Bass	Savannah, Chatooga, Horsepasture, & Toxaway Rivers				Peripheral-Undetermined in N.C.
Etheostoma inscriptum Turquoise darter	Savannah, Chatooga, Horsepasture, & Toxaway rivers				Peripheral-Undetermined in N.C.
Lepomis marginatus Dollar sunfish	Yadkin, Lumber, Waccamaw, & Cape Fear R. Sys.			Possible channelization projs. SCS, Dams on Yadkin	Peripheral-Rare in N.C.
Lepomis punctatus Spotted sunfish	Yadkin, Lumber, & Waccamaw R. Sys.			Possible channelization projs. SCS, Dams on Yadkin	Peripheral-Rare in N.C.
Notropis bifrenatus Bridle shiner	1 record, Tucker Cr. Neuse R. Sys. Craven County	quiet, weedy areas	Possibly introduced, range Chesapeake Bay north		Peripheral-Undetermined in N.C.
Exoglossum maxillingua Cutlips minnow	Restricted in N.C. to Dan R.	pools, mod. size streams		Walnut Cove, Mayo, Martin, & Schoolfield Dams.	Peripheral-Endangered in N.C.
Noturus gilberti Orangefin minnow	Roanoke R. Sys.	Riffles of clear areas, rubble		Walnut Cove, Mayo, Martin, & Schoolfield Dams.	Peripheral-Rare in N.C.



THE RUFFOUS-SIDED TOWHEE

by Grace S. Draper
Pleasant Garden

PHOTO BY REX SCHMIDT

COMPLETELY contrary to the wishes of the then highly patriotic ladies of pre-Revolutionary Edenton, N. C., who in October, 1774, protested the drinking of tea by signing a resolution to that effect, the lovely towhee has been calmly proclaiming a melodic "Drink your tee-ee-ee" from the treetops for lo! these many years! His most welcome invitation may come clearly and crisply, and quite unexpectedly, on the hottest summer day or the coldest winter one, when a glass or cup of the beverage (as the proper case may be) would surely hit the spot. His two-syllable call has been interpreted to sound like **towhee** or **chewink,** hence his name.

We should feel fortunate in many states to have this interesting bird as a year-round resident. It is essentially a bird of the thickets, overgrown pastures, and forest clearings. Certainly it is a most welcome visitor to our yards and gardens, as it scratches noisily among the mulch or humus beneath the shrubbery in search of insects, jumping back and forth, as does a little bantam hen. It likes weed seeds, wild fruits and berries, and will readily come to the winter feeding station for cracked grain. This is a solitary bird, and only occasionally will be seen in company with another towhee, its mate, or its young.

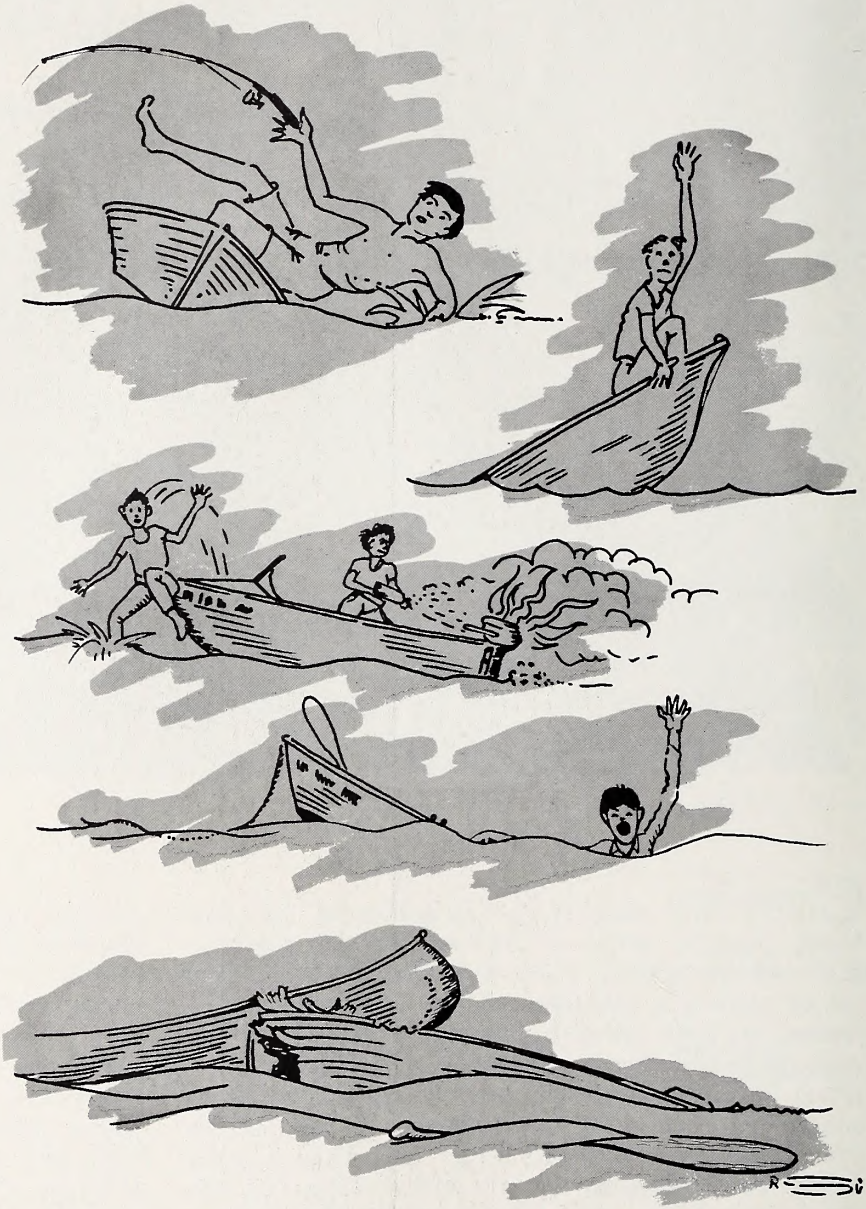
The towhee is a slender bird, seven to eight inches long, with reddish eyes. The male has a black head and tail, with white feathers on each side of its long, rounded tail which flash when it takes flight. It has a white breast with bright chestnut-orange side feathers. The female bird is a replica of the male in coloring, except that she is brown where he is colored black.

This bird may raise two or three families in the late spring and early summer. Its nest is rather thickly constructed of a combination of such materials as small stems, dried leaves, coarse blades of grass, strips of bark, and shreds of corn shucks, lined with fine grass and hair. Often placed on or near the ground, where the babies are an easy target for predators such as cats, dogs, and snakes, nests may be found in small shrubs, trees, or brush-piles from three to six feet above the ground. A friend has had a towhee nest twice one summer in the thick branches of a shrub beside her front door, about three feet up. Last July we found a towhee nest in a small red cedar tree near our house, six feet up. Nesting in the same vicinity at the same time were a bluebird in a nesting box, a yellow breasted chat in a low coralberry bush, a wood pewee in an old oak, and a cardinal in a small walnut tree.

The towhee's four to six eggs are about the size of a robin's egg, white in color dotted with reddish-brown specks. The baby birds hatch in approximately 12 days, with the young remaining in the nest 10 to 12 days. The young **must not** be disturbed as they could leave before being able to fly, and they will not return to the nest.

Pleasure Boating—How Safe Is It?

By Rod Amundson and Ed Jenkins



WHAT are the odds in favor of your safe return from a boating trip this summer? Compared to a safe return from a ride in a motor vehicle on the highway, they are pretty good.

In 1972 there were 1,975 highway fatalities per 100,000 registered vehicles, or almost 2 percent. During the same year there were 44 boating fatalities among 92,607 registered boats, a percentage of less than .05. That is a good record, but it should, and can be, a lot better.

An attempt to analyze statistically all the factors involving boating accidents would be like trying to interpret the Book of Revelation. About the latter, Martin Luther said, "Many have tried their hands at interpreting Revelation, but have succeeded only in soiling their fingers." But maybe we can at least point out some facts and figures without getting our fingers wet.

In 1972 there were 61 boating accident fatalities. This contradicts the percentage given above. Why? The comparison was made with *registered* motor vehicles, and 17 of the boats involved in fatalities were not registered.

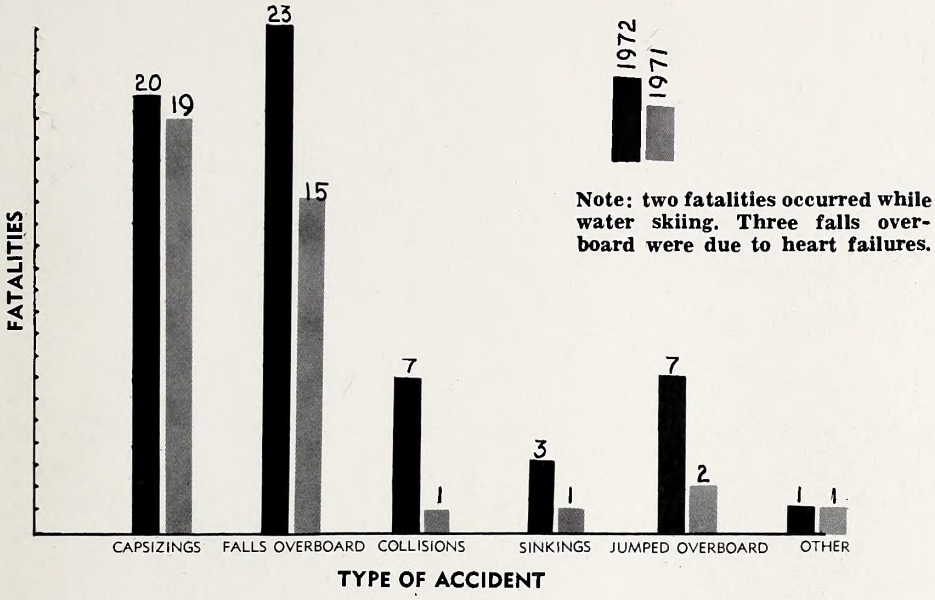
In 1972, among 92,607 boats registered, there were 160 boating accidents, 61 of which were fatal. In 1969, 70,687 boats were registered, and there were 112 accidents of which 66 were fatal. The following year 76,239 boats were registered: 127 accidents, but only 37 fatalities. All this only proves there is little correlation between the number of boats registered and the number of fatal accidents.

The records show certain months, days, and times of days when it would appear more dangerous to go boating. In 1972, June was the most dangerous month, April next, May and August tied, with October and November last. But a single accident involving six or seven people could make any one of these months seem to be most dangerous. The only conclusion to be drawn from this is that most accidents seem to occur during the months of greatest boating activity.

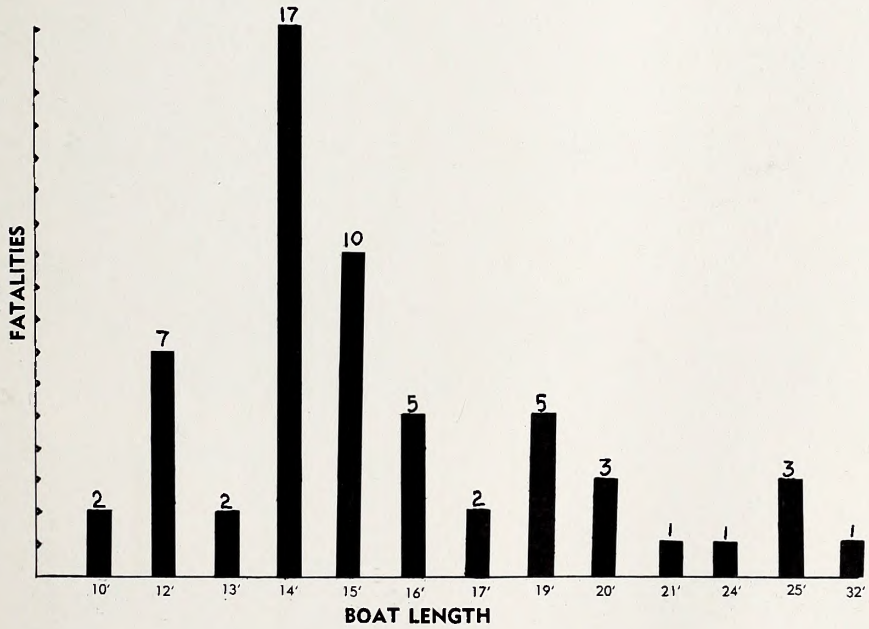
In 1972, Saturdays were the most dangerous days with Sundays and Wednesdays tied for second place, and Fridays third; but that could change this year with the whims of fate. Mondays, Tuesdays and Thursdays would seem to be the safest days for boating, but people get killed on those days, too.

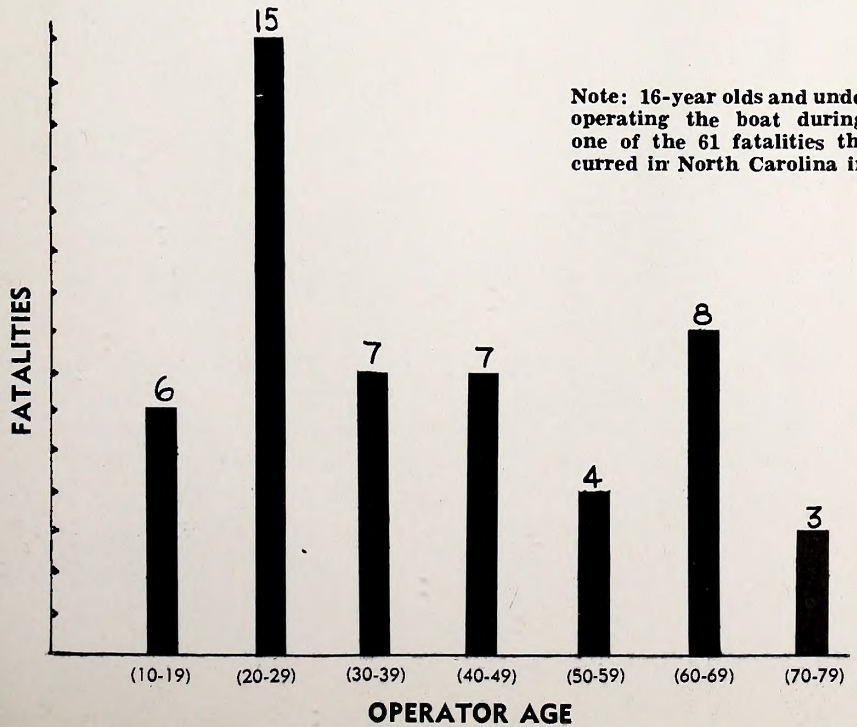
As to the causes of boating accident fatalities, the figures here are significant and have followed the same general pattern over the years. Twenty-three people fell overboard; 20 were killed when boats capsized; 7 people jumped overboard; 3 died when their boats sank. One other fatality occurred when a water skier, not equipped with lifesaving equipment, drowned before the tow-boat could reach him.

The figures on size of boat



Note: two fatalities occurred while water skiing. Three falls overboard were due to heart failures.





Note: 16-year olds and under were operating the boat during only one of the 61 fatalities that occurred in North Carolina in 1972.

compared to fatality rate seem to be significant. Boats 16 feet long or under were involved in 43 fatalities; over 16 feet long, only 16 fatalities. There were 11 deaths in which the length of the boats involved were not reported. Does this mean smaller boats are more dangerous than the larger ones? Or is it just that there are more of them?

In 1972, 50,420 boats up to 16 feet in length were registered, and 39,753 over 16 feet. So we can reasonably draw logical conclusions from these figures: larger boats are either safer, or their operators are more careful.

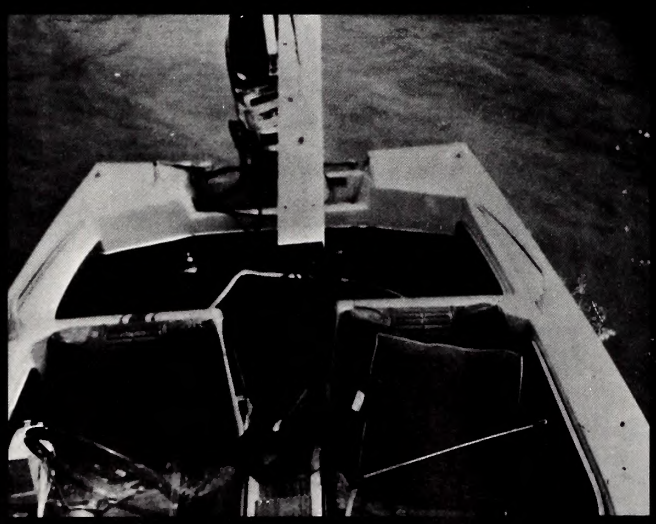
Now for age groups. The boating safety act of 1959 sailed through the General Assembly partly on the argument that "These crazy teenagers on water skis have got to be controlled!"

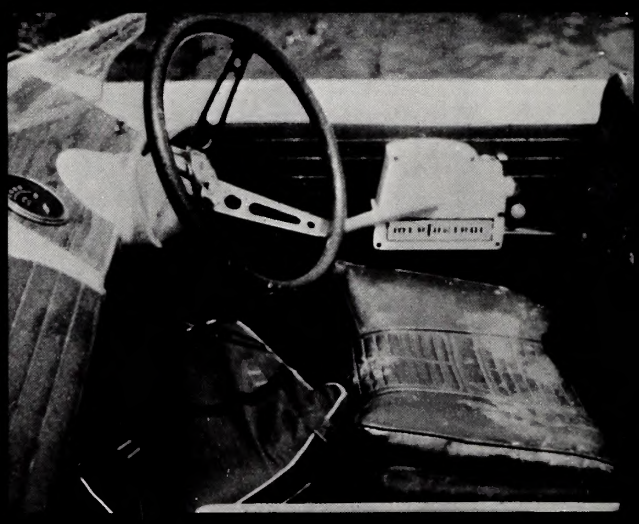
This rocks the boat again, statistically. Last year only 6 people from 10 to 19 years old were operating boats in which fatalities occurred. The rest ranged from 20 to 79 years. In 11 fatalities the victims' ages were not recorded, but most 1972 victims were between the ages of 20 and 29.

Analyses of facts and figures are not apt to save a single life. The only people who can save lives out on the water are the boaters themselves. For example, of the 30 people who fell or jumped overboard last year, most would very likely be alive today if they had been properly equipped with lifesaving equipment. And the same may be said of the 20 who died when boats capsized.

Now we can go back to the comparison with motor vehicle accidents. Not many people are killed by falling or jumping out of cars and trucks. So when you consider only 7 Tarheels died in boat collisions, the water looks a little calmer.

Last year there were 1,975 motor vehicle deaths per 100,000 registered vehicles, almost all involved in collisions. That makes 7 deaths from collisions among 92,707 registered boats look pretty good!





PHOTOS BY JOHN GADDY

NIGHT RUN

Take an unlighted pier (which in this case had been struck by boats twice in the past), jut it out into a pitch black night, add a speeding motorboat zipping through the darkness, and the results are not pretty. The score on this one was one fatality and two critically injured persons. Take it easy, particularly at night.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

R. Wayne Bailey Honored

R. Wayne Bailey, of Milton, field biologist for the Wildlife Resources Commission, brought honor to himself and the Commission when he was given the American Motors Award for Conservation in the professional category.

In a long professional career, Mr. Bailey has made many contributions to the general knowledge of wildlife conservation, but he is most widely acclaimed for his pioneering work in developing progressive restoration and management programs for the wild turkey. His contributions are cited as one of the outstanding accomplishments of modern wildlife management. He retired from the West Virginia Department of Natural Resources in 1970, following 25 years of service, but is carrying on his work as head of the turkey project of the Wildlife Resources Commission.

Hunting and Trapping Regulations Set

The regulations for hunting nonmigratory game and trapping were established in May this year by the Wildlife Resources Commission. The earlier date was made necessary because printers capable of printing several hundred thousand copies needed more time to finish printing in time to deliver the regulations before August 1 when the new regulations go into effect.

Leave Them Alone

People who find deer fawns or other forms of wildlife are warned to leave the animals where they find them. Only rarely are young wildlife orphaned or abandoned by their parents. Although these young animals may make nice pets for a time, they invariably become cross or dangerous. North Carolina has stringent laws prohibiting taking game species out of season.

The Case of the Jutting Jaw

by James A. Sullivan
Virginia Polytechnic Institute and State University
Photos by the Author

IT was a battle between my common sense on the one hand, and my limited knowledge of turtles on the other. I knew they dug holes to lay their eggs, but that was ridiculous. Why would she cover herself completely, and why also in such a dark, shady spot?

I never would have noticed her had she not opened her mouth. Lucky for me I was warned with that hiss. It was just a common snapping turtle *(Chelydra),* but it was on land. And on land, a common snapper quickly becomes overtly irate when approached by an intruder. Never do they seem to back away or clam up like their shy kin, the box turtle.

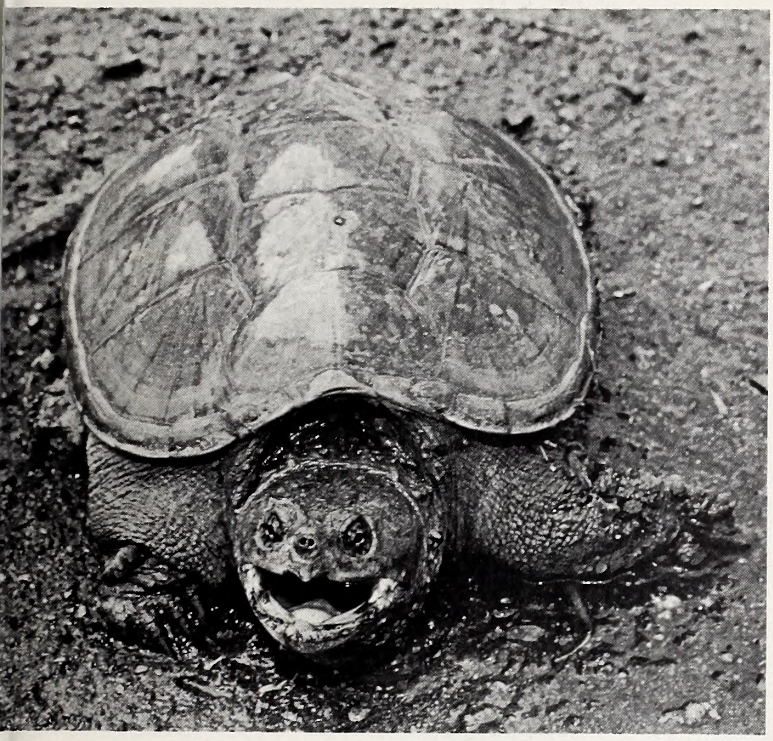
It's the right time of year to lay eggs. The young snapper we found last September was on his first trip to the water, and subtracting the 80 to 90 day incubation period from that date, mid-June seemed reasonable for a female *Chelydra* to dig her nest. But right time of year, or not, it wasn't the right time of day. Here it was, six-thirty in the evening, that I happened upon this head poking out of the sand. Female snappers supposedly never stay at their egg laying after mid-morning. With this in mind, the possibility of egg laying was discarded, and I mentally neutered the object of my curiosity.

Could it be just coming out of hibernation? That's doubtful. Although suggested that the snapper is one of the first turtles to hibernate, they may be seen to move around on those warm winter days, even with ice yet on the water. And this was June, the mud around her quite warm to the touch. Surely its metabolism was now fast enough that it had to look for food. By no means was it in a stupor, reaching its neck out like that and snapping at both me and my dangling camera.

It had been moving its head around a good bit, the neck leaving a smooth conical depression leading down into the mud. There was no sign whatsoever, though, that the big turtle had dug into the mud, the smooth and level bank being not the least disturbed except for the bulky jaws jutting from the hole.

ON our fishing trips we were always accompanied by snappers. They would stick their nostrils and eyes out of the water for a breath and a look, and float there lazily for the longest time. But raise a paddle, the head would disappear without a ripple, and the big dark body would sink, blending quietly, slowly with the dark depths. We used to catch them then. At least my dad always knew when a snapper was to blame for the missing catfish bait, neatly removed from the trotlines.

If there was anything I learned then, it was never to drop a hooked snapping turtle into the boat. In water they're not so bad, all they want is to keep their distance. But drop them in the boat, and beware. I knew that. But either because I didn't realize at the time that to a turtle, a boat and the bank are the same, or because I didn't want to lose that new lure, I tried to delure a hooked snapper one August afternoon. Being bored and bassless, my mind would let me do nothing but sit there under the willow, dropping my lure down the steep bank to the bottom, pulling it, making it flutter up two feet, only to drop, again and again. Out of hunger, or out of spite, I yet am not sure which, a large snapper grabbed it from his muddy retreat, and just lay there for me to drag him out on the bank. His feet firmly planted in the grass, I pulled his long neck out, but, like



The open jaws of a snapper on land are always directed toward an intruder. With the strength of his lunge, he can completely clear the ground. The hooked beak and powerful jaws can inflict damage.

a crosscut saw, only to be pulled back by him. After much twisting and tugging the inevitable came, the turtle did his proverbial thing.

I immediately envisioned losing my whole thumb like that guy we had seen at the Florida reptile farm. The fact that he could display his digit in a jar was of no comfort. I superstitiously hoped for a thunder storm, so that the turtle would hurry up and let go. It was still four hours before sunset. Luckily, the badly placed hit glanced off my slick thumbnail, and all I was to lose was some blood and my new lure.

Nevertheless; recalling that experience with a stranded snapper, I moved to the rear of the turtle in the mud, making sure its long neck was no match for my distance from the still gaping jaws. Maybe this turtle had a taste for shore animals and had positioned itself, waiting to grab innocent prey. The snapper will do just that amongst underwater vegetation. But on the bank?

The big alligator snapping turtle in the Memphis Aquarium has always fascinated me. Though in a different genus *(Macrochelys)* from the common snapper, the ranges of the two coincide in the Mississippi Valley and Gulf States, and they share that habit of quietly lying concealed in bottom muck, awaiting unsuspecting prey. The captive Memphis turtle, none too small to make a good-sized washtub, is always in the same corner of his tank. Appearing as a boulder, all overgrown with a variety of algae, his mouth is forever agape for both his human and piscine viewers.

To make up for his immense size and concomitant ineptness in the chase, the alligator snapping turtle has turned into a well-tackled fisherman. Along the middle of his grayish yellow tongue, in that dark cavern of a mouth, is a very succulent looking grub-shaped appendage. Never in what seemed like hours of that first day of watching the Memphis turtle, did that pinkish worm of a tongue cease to twist and wiggle. Pity the hungry, unsuspecting fish they put in *that* tank. One nibble at the delicious grub, and, with a snap, the turtle gets the meal instead.

DIGGING out the shell of the snapper for a few pictures, I occupied its head with a stick. As I dug, though, the stick became shorter and shorter. That a 100-pound-plus alligator snapper has reportedly cleaved a broomstick with one lunge I surely believed. This 15 pound common was making driftwood kindling with ease.

Though taken for food, especially for outlets in Philadelphia, the snapping turtle is probably more often shot and left as carrion, because of his meanness and poaching habits. In a Michigan study of the snapper, however, Lagler* found that 70% by volume of the intestinal contents of *Chelydra,* consisted of vegetable matter, and that 40% by volume of the stomach contents were the same. Though it would be unreasonable to allow snappers to remain in artificial fish rearing ponds or on ponds with pet ducks, Lagler suggested that there need be little concern over the snapper as a detriment to game fish populations. If anything, they help in controlling the numbers of smaller fish, so often the death knell of farm ponds and lakes.

I picked up the snapper by the tail and held him at arm's length, avoiding his open jaws, and making sure he couldn't get a foothold sturdy enough for a lunge at my toes. After a number of photographs of his throat and menacing beak, I headed him toward his more natural aquatic medium, and laid him half in, half out of the water. In the current and gone he was without so much as a splash.

It was the only answer I could give. Last week's rains were responsible for this week's high water. Now subsided, the water had left a buried turtle on the bank with only his head above the drying mud. Whether he had buried himself to avoid the stiff current, or just to wait for a meal; whether he would eventually be able to dig himself out, or be left to dry, these questions I still can't answer.

Nonetheless, he is now back hunting his river haunts; I feel I did right. In spite of his unsocial behavior when cornered, in spite of his reputed voraciousness, the snapper has a place, both in my mind, and in his aquatic habitat. ◆

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* Lagler, Karl F., 1943. Food habits and economic relations of the turtles of Michigan with special reference to game management. Amer. Midland Nat. 29: 257-312.

Ah, the Beach

O Beautiful For Spacious Skies....

For Amber Waves of Grain....

For Purple Mountain Majesties....

Emerald waves curling on wide, sandy shores of unsullied sand where you can walk and be alone with your thoughts . . . high dunes where you can stand and almost touch the sky . . . green salt marshes stretching to the horizon . . . charming coastal villages with fishing fleets . . . crunchy fried oysters and shrimp . . . fishing . . . swimming . . . shell hunting . . . relaxation . . . the best of life.

Have you been there lately? Our beaches are rapidly changing. Many of North Carolina's beaches are cluttered traps of humanity, canopied with neon signs and telephone wires . . . the roadsides, sand and sounds are public garbage dumps . . . trash and trailers stretch to the horizon . . . crowded cesspools spew their poison into the waters . . . amusement parks rise like gay mausoleums, but the only thing bitterly amusing about them is their tribute to man's own folly . . . the land is ruled by metal blades and greedy men, and all of us are guilty . . . our beaches are being raped, and the criminals return to the scene of the crime with that lean and hungry look, seeking out the last wild areas.

Look around next time you're down. Is this what we wanted? Is this man's golden dream? Is this our legacy?

Jim Dean

Above The Fruited Plain

Watch Out!

by Lorraine T. Carter
Raleigh

ACCORDING to the National Safety Council, there are over 60 varieties of poisonous plants in the United States capable of causing local skin irritations that result in dermatitis venenata. Not all of these plants affect everyone, and while most people are immune to the irritating action of the majority of them—there are three culprits that are almost sure to affect nearly everyone, in varying degrees, who touches them. Deceiving in their looks and possessing foliage delightful to the observer, these plants are poison ivy, poison oak and poison sumac. Immunity to contact with them on one occasion does not necessarily mean the same persons will be immune later. And some persons become more susceptible to the poisoning after once having suffered it.

Dermatitis venenata (skin poisoning) may appear from one to three days after contact. Affected areas first become red, swollen and intensely itchy. Later small blisters appear, which spread, unite and form larger blisters. The oily secretion which appears on poison ivy, oak and sumac is the agent responsible for skin irritations. The droplets are so minute they may be readily conveyed in the smoke of burning plants, by insects or an article such as a shoe which has come in contact with the secretion.

If skin irritation does not appear by the third day after contact and does so later, it is most likely due to oleo resins that have remained on clothing and later contacted the skin. Cases have been reported where garage mechanics have developed the poisoning from working on cars that had been driven through areas infested with the poisonous plants.

POISON IVY *(rhus toxicodendron,* sometimes called mercury), grows in all parts of the United States except the extreme southwest, and is extremely well adapted to the soil and climate of North Carolina. Though usually found in uncultivated areas such as woodland borders, around isolated trees or poles, don't be surprised to see it sneaking up your backyard fence. The plant may be found climbing tall trunks of trees as high as 60 feet, creeping in and out among bushes along roadways, or serving as a lush green carpet on cool forest floors.

It even thrives in wastes of sand where little other vegetation can exist. Usually it is a trailing vine, clinging to its support by a thick fringe of aerial rootlets that appear at intervals along the stem, although sometimes it assumes an upright shrubby growth. Its fresh shining foliage is a charming green even in the driest, hottest days of summer, but I would not want to use it as greenery in a floral arrangement.

Poison ivy is recognizable by its foliage, always in groups of three oval shaped leaflets which may be quite smooth or notched along the edges. They have an oily appearance. In May or June,

The differences in appearance (and effects on the skin) between poison ivy (above) and poison oak (below) may be a bit difficult to detect. Both are to be left strictly alone. There seems to be no such thing as permanent immunity to the skin irritation they can cause.

small white clusters of flowers appear, growing from the side of a stem above a leaf. When mature, the plants bear white waxy berries, also poisonous to the touch. In early autumn, the foliage changes to rich glowing shades of scarlet, a delight to the most casual observer; yet its beauty is nothing compared to the suffering it causes every year to thousands who inadvertently come in contact with it.

POISON OAK *(rhus diversiloba, rhus quercifolia, rhus radicans,* also sometimes called mercury), a plant of the same genus as poison ivy, is a small branching shrub about three feet high. The slender branches often have a downy look. It is prevalent throughout the eastern United States—from New Jersey into eastern Texas. The foliage is always in groups of three leaflets. The center leaf usually has an oak-leaf look and the side leaves may have uneven edges, sometimes deeply lobed. (The plant is not to be confused with the oak tree, which of course is non-poisonous).

The flowers look and grow like those on poison ivy, but the berries are more likely to have a downy appearance. This plant also thrives in North Carolina, though to a lesser degree than poison ivy. (Western poison oak, which is not seen in North Carolina, grows along the Pacific Coast from southern California as far north as Canada. In open fields it is seen in large spreading clumps—sometimes six feet tall, and in the forest, it can grow as tall as 25 to 30 feet. The foliage has a glossy leathery look, always in groups of three leaflets, with the center leaf having a definite oak-leaf look. The side leaflets often take irregular shapes.)

POISON SUMAC *(rhus venenata, rhus vernix)* is a shrub or a small tree sometimes reaching a height of 25 feet. It grows in swamps and damp areas of almost every state. Like poison ivy and oak, it also thrives in North Carolina. The foliage is somewhat like that of the ash tree or alder bush and occurs in groups of from 7 to 13 sharply pointed leaves arranged in pairs along a central midrib with a single leaflet at the end. The leaves have a smooth oily appearance and can be distinguished from the non-poisonous variety by the way the blossoms and fruit spring from the notch between the leaves and stem.

The non-poisonous shrub is of the terminal bearing variety where the fruit appears in red clusters at the end of the branch instead of in the crotch of the leaf. Also the number of leaves on the harmless sumac varies from 9 to 21 or even as high as 31, while the flower clusters are dense and upright as compared with the droopy clusters of *rhus venenata* and *rhus vernix.* In the spring, the leaves on the poisonous sumac are a bright orange color and have a velvety covering. Upon maturity they assume a dark green glossy color on the upper surface, gradually turning to a brilliant red-orange or russet. The flowers are minute yellow blossoms growing in long narrow drooping clusters, and the berries are a smooth ivory white, slightly elongated, and sometimes with a yellowish cast.

Poison sumac is not really a very plentiful plant (below) and can be confused with the common staghorn sumac (above). Leaf shape is somewhat more rounded in the poison variety, and it has a much less showy seed head.

While skin irritations resulting from contact with poison ivy, oak or sumac constitute one of the greatest hazards to vacationers who take to wooded trails, camp sites or other natural habitats, it is by no means restricted to the summer season. It remains a hazard during all seasons of the year—to the hunter, the fisherman, construction workers and road-builders, and to all who come in contact with it, whether at work or at play. As anyone who has ever suffered the discomfort of dermatitis venenata can tell you, the best preventive measure is to learn to recognize these poisonous plants, avoid them by keeping a safe distance away and never, never touch them. ⬍⬍

My Newest Varmint

by Frank Mooney

MORE than once I've read about a writer leaving his home town, where he'd left green, living things, returning years later to find only concrete and housing developments. Wildlife was just a memory. After a five-year odyssey I returned to the home place and actually found some wildlife more abundant and one varmint I had never seen while spending most of my childhood on the farm. Deer had increased, with raccoons on the verge of a population explosion. Raccoons are now killed along the highways where cars take a big toll. I can remember 15 years ago when a coon track was a special delight for me to see in a muddy ditch or along some sandy streambed.

Now, farmers tell me about raccoons that raid their early garden corn and play havoc with the succulent ears while in the milk stage. Deer have migrated into slash timber where chain saw and sawmills leave ugly scars in the virgin timber. But sawmills are not all bad. Sure the squirrel suffers, but herbivorous animals such as deer can often browse upon fallen timber and the various grasses that quickly shoot up from the forest floor. The rabbit favors this area also, for the cover and nutritious growth. The renewal of nature can play an important part for the wary turkey as well.

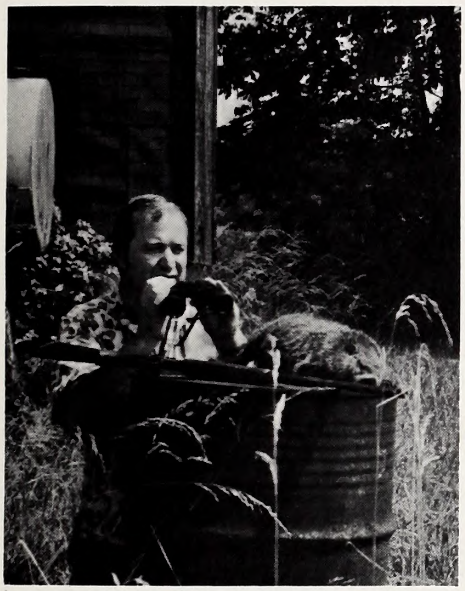
During my opening lines of expressing the joy of finding more game, I got sidetracked from my story. During my years of living on the farm and roaming the fields and streams, I failed to see a groundhog or find a den that I thought one had made. Only once during my childhood do I remember someone seeing a woodchuck near home. One day a neighbor saw one when returning from Roxboro, and I quickly asked the location, but never set eyes on the critter.

Then one June about four years ago, I returned to the Person County home place with my wife and two children for a short visit. A large pile of dirt and debris had been pushed up at the lower end of the garden. My brother-in-law quickly told me about my mother's boxer that had killed a couple of young groundhogs, and the day that he had made the dog let one go that was cornered some distance from its den.

After seeing what the chucks had done with the garden, I could see why my brother-in-law had resented letting the varmint go unharmed. The lower end of the garden looked like someone had taken a mowing machine and made several runs near the pile of debris. From the quick destruction of the garden, my brother-in-law thought the groundhogs had been taking two rows at a time.

But it was summer time, and I didn't have a rifle or shotgun with me. I quickly borrowed an outdated shotgun and a couple of shells, and hid near the pile of debris. After stillness crept over the garden and the sun's glare faded into the west, a chuck silently appeared from a hole in the debris. I waited until the rascal crept into the garden then rolled him in the snaprow. As I crept forward to claim my trophy, a sharp, piercing whistle stopped me cold. I spotted a large one perched on a log near the top. A quick blast made it bite the dust.

THAT was my first close look at a groundhog. The large one was a female, and the easy living was in evidence as I hefted the weight. "Gosh," I thought, "something this big could easily strip a garden." The groundhog when fattening up for the "big siesta" can consume quite a bit of fodder before old man winter locks up their playhouse. I was happy over the kill but would have enjoyed it more if I had had a rifle with 10X scope and dusted them off from a couple of hundred yards. However, the safety of the garden was in question, and I slid my feet under my brother-in-law's table



A good pair of binoculars and an accurate, scope-equipped rifle are tools of the 'chuck hunter. The critter is apparently expanding its range; the latest reported population is along the Roanoke River as far east as Halifax County.

every chance I got. So the sport would have to wait; I was mainly interested in the results.

During this time, unknown to me, some farmers nearby were having trouble with these whistle pigs. Two years later, I moved back to the home place and found that the varmints were getting to be a problem in some areas. I was a sucker for any off-season plinking, so I started asking farmers and reading up on the habits of the groundhog. One farmer asked me to kill a big chuck that was cutting his garden to shreds. His wife was upset because she had put a lot of time into planting and working the garden. He went on to tell me about putting his shotgun into the truck and riding up to the garden.

On several occasions he had caught the pasture poodle flatfooted in the garden. He shot up the vegetables a little, but didn't harm the chuck. I gladly accepted and took my rifle with 4X scope and waited near the edge of the woods. About 7:00 p.m. after the farmer had gone home and no sounds of human activity could be heard, I started my evening vigil. Shortly, a pea vine suddenly disappeared. The groundhog had cut the whole vine with one quick bite. After several trying moments, the crosshair steadied, and the farmer's problem was eliminated.

In Granville County the groundhog seems more plentiful. One farmer told me to shoot all the varmints I could find. In the springtime some chucks had tunneled under most of his buildings on the farm, and ripped the plantbed covers open to get to the cabbage plants. I found two large chucks in a field near a small stream, but failed to score. Those sharp-eyed varmints were smart, and the only chance I had, I blew it. The 80-grain bullet of my .243 Winchester kicked dust in one's face, and a hasty retreat didn't leave enough time for a second shot.

Since the groundhog invaded the Central Piedmont, I have been asked by several hunters how to find and hunt this varmint. A quick look at a garden will tell if Mr. Groundhog is living close by. Piles of debris, old abandoned houses, feed barns and old pits where tobacco was once stored long enough to gather moisture for grading are some of the better places to dig their burrows. Also, river banks and rock piles are utilized by the whistle pig. Rows of pushed-up dirt, stumps and trees are ideal places where the bulldozer has cleared land. Just a year ago, I shot two large females where a dozer had cleared an area for a plantbed.

On one farm near home, I shot five groundhogs last year during the month of June. All were either under a barn or in a large pile of debris near the barn. One day I felt lucky and traded my rifle for a bow. After stringing the bow and grabbing a sharp broadhead arrow, I made like an Indian around the corner of the old barn. A large female and her young were eating grass only a few feet from their burrow. I crawled within 10 yards of the old one, but a small limb made it impossible for a clear shot. The hog smelled me or caught my movement and quickly disappeared down a bolt hole. By then, the young one had strayed a short distance from the den, and I took quick advantage of the break. The arrow just brushed the guardhairs along its back. That critter swapped ends in a hurry and made a beeline for the burrow. Once inside, it gave forth with angry, short whistles for 10 minutes.

ROBERT Gentry told me he saw his first groundhog in 1958. He caught a young one and called the wildlife protector to help identify it. It was two or three years later, he said, before groundhogs started to eat his crop. Flat River flows nearby; the high banks serve as migration routes and have well-drained soil for digging burrows. A couple of farmers near Oxford told me that skunks and groundhogs were never a problem until Kerr Lake filled with water. They said as water filled the 50,000-acre lake, some of the groundhogs migrated

their way. Wildlife from that large an area had to migrate some way, so there's sound logic that this did happen. From my observations, Granville County has more chucks than Person County, and being nearer the lake helps to verify what the farmers say. Anyway the pasture poodles are here, and I am trying to hold their number in check.

Woodchuck hunting in some ways resembles deer hunting. You spend a lot of time looking for your quarry, then it's often necessary to stalk closer and shoot from a concealed position. From my experience, the whistle pig has eyes much like the deer. A still form is hard to recognize, but the least movement will put it on the alert. Also smell is another method used by both animals, however, the chuck's sense of smell cannot equal that of the deer. Finding a vantage point and glassing is the most exciting way of hunting for me. Early morning and late afternoon usually have the most activity. Anytime after a cooling rain when the sun pops out to dry the grass and warm the earth is a good time to catch the woodchuck on the move. Some hunters prefer moving until the quarry is sighted, then stalking closer for a shot.

One day in June I stopped in a country store to ask about hunting groundhogs in a pushed-up field nearby. After popping the top on a cold pepsi, the farmer that owned the field spoke up. "I'm fixing to go home. If you'll follow me, I will show you where to hunt." I thanked him and crawled into my station wagon. There were several piles of stumps, logs and dirt pushed up in the pasture. "The cows are in another pasture so there's no problem of shooting anything," he said. I thanked him again and grabbed the .243 Winchester and 7 x 35 binoculars. I quickly shot two large females near the car then went up the hill to glass some more mounds of dirt. These sharp-eyed rascals must have spotted me when I left the car.

I found several fresh burrows, but no groundhogs. One can tell if the dens are lived in. Usually, there will be some sign of fresh diggings or tracks. However, the best sign is flies swarming around the entrance to the burrow. When I returned to pick up the two I had shot, another one was feeding only a short distance away. My offhand shooting is nothing to brag about, and that one made it back to the den unharmed. A large chuck still excites me.

"Giving you the flag" is used by woodchuck hunters when the critter waves his short, bushy tail back and forth after a fatal shot. It takes a lot of lead to anchor this tough varmint. Many have been killed with a .22 rifle, but the head or spinal shot is necessary for a clean kill.

MANY hunters use their deer rifles when gunning for groundhogs. It helps the hunter to get more familiar with his rifle and enjoy some off-season plinking. Anyone that can consistently score on groundhogs will have no trouble bagging a buck when the time comes.

Here's a list of rifles with the correct grain bullet to use in this pleasant pastime. The newest and one of the lightest varmint rifles is the .17; with its light recoil and mild report, it adds much to the varmint hunter's pleasure.

.22 Hornet with 45-grain bullet.
.220 Swift with 48-grain bullet.
.222 Remington with 50-grain bullet.
.243 Winchester with 80-grain bullet.
.257 Roberts with 87-grain bullet.
.264 Winchester with 100-grain bullet.
30'06 with 110-grain bullet.
.270 with 130-grain bullet.

Self-hunting dogs take a large toll of young groundhogs each year. They are easy to kill when caught away from the den. One farmer told me that his dogs brought young groundhogs to the house, but he never saw the old ones or their burrows. One day I checked out a known chuck hole. I saw the grass move and put the scope on it. It was a young-of-the-year chuck not quite half grown, so I lowered the rifle. Quickly, I crawled between the chuck and its den. The rascal must have seen my movement and started for the den.

When it got within 5 feet of my position, it flattened out in the grass and was almost impossible to see. I laid the barrel of the rifle across its back and tried to pick it up. It slid from under the barrel and ran toward the den. I ran around it and stopped. It would have run between my legs if I had not blocked its way with a boot. This time I picked it up by the tail. That was my first experience of being charged by a groundhog, and a young one at that.

It tried to bite for the first time. I set it down easy and watched it scamper for the entrance. It stopped for a moment at the opening to look back, then disappeared down the chute.

Until last summer I had not noticed the sex of every animal I shot. One day it dawned on me that every large chuck that I shot and had noticed was a female. So last summer I made a note. During the first three weeks of June I shot eight adults. One of these was shot only inches from the burrow's entrance, and it managed to kick back into the den as I went to pick it up. I was unable to determine the sex, but the other seven were females.

This is a mystery to me. On one occasion, I shot three groundhogs with their dens in sight of each other, and all were females. Experts say that these varmints normally stay one to the burrow, except when a female has young. Then the young are quickly sent out into the world to fend for themselves. Where do the males stay? Could they be a lot sharper than the females? This really has me puzzled.

WHEN hunting in the Piedmont, one can not expect to get shots like a varmint hunter would in the mountains. Usually two woodchucks a trip is about the limit for my shooting. Sometimes I

don't even see one during a hunt, but most of the time I have a good idea of where a used burrow is located before I venture forth. On one occasion a friend of mine called and said four groundhogs were dug in under the barn behind the house. I made two trips late in the day after work and got one each time.

The next week I went back to the same pasture that I mentioned earlier in the article. This time I took the precaution of staying hidden from those sharp-eyed chucks. After crawling through a fence and sneaking through a small patch of woods, I crawled into position behind a pile of logs. It was almost 7:00 p.m. and time for those "appetites on four legs" to be moving about. After several minutes of glassing, I saw an old, grizzled one sunning on a stump near the top of a pile of dirt. Slowly, I slid the .243 into position. The distance was about 150 yards and my rifle was zeroed in at 100 yards. A strong crosswind was blowing to my left. At the crack of the rifle, the chuck sprang off the log.

I continued to glass the rest of the pasture with no luck. Thirty minutes later, the same chuck crawled onto another stump to look around. It seemed puzzled, because I was well hidden and it couldn't smell or see me. This time I squeezed off a round and the hog leaped to the ground and took off across the pasture toward the woods. The high grass hid its escape. The way I was shooting that day, he wasn't in much danger. Later, I checked the stump. The bullet had hit low, but cut some hair from the chuck's stomach. A few minutes later another grizzled old grass eater stood up to see what all the noise was about. I quickly bagged this one. Walking back to the car I saw one dash for a den.

When farmers are polite enough to let you hunt, be nice enough to take away the animals you shoot. Letting them lie in the field to decay and draw flies might stop you from shooting the next time you ask; and it's poor outdoor manners.

Some hunters claim that a young chuck is mighty fine eating. Any gourmet that wants to sample this dish can give it a try.

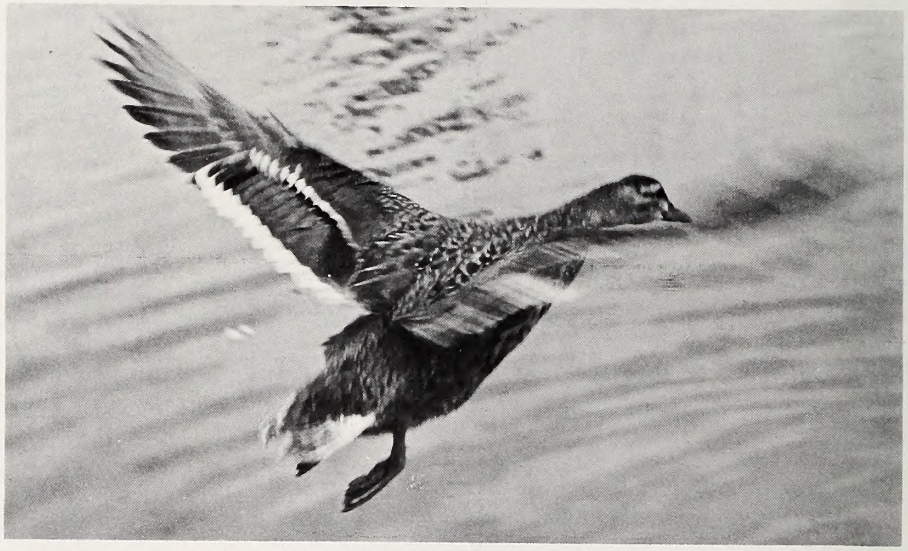
Clean the woodchuck, remove glands from under forelegs and small of back. Remove meat from bones and grind it. Add breadcrumbs, onion, salt and pepper to taste, egg and shortening, and mix thoroughly. Form into patties, dip into egg, then into breadcrumbs. Fry until brown in hog grease. Cover with currant jelly sauce and bake in slow oven for one hour.

I remember one woodchuck in particular that almost gave me the slip. It took six or seven trips before I was able to connect. This critter had burrowed under an old barn near a garden. It had two holes dug up front and one escape route in the back. The first trips, I drove by the barn then parked the car out of sight and walked back. With fresh dirt and flies swarming near the entrance, I knew the chuck was still setting up house. One day a brainstorm hit me, maybe I was scaring the varmint with the car. Most animals are not alarmed by cars if the driver continues in a steady pace, but slow down or stop and it's another story. So I drove a back road near the barn then walked across a field to the chuck den. Sure enough, the groundhog was standing only inches from the entrance with its profile hidden by a bunch of tall grass growing against the barn. This time I caught the female with her guard down.

The woodchuck is not classified as a game animal and can be shot any time of year. However, most dedicated varmint hunters wait until the last of May or first of June to pursue their favorite sport. Leaving offspring in the burrow too young to fend for themselves does not set well with me. A valid North Carolina hunting license is required to take this animal.

If you're looking for an off-season hunt, and want to keep your shooting eye sharp, and maybe get more familiar with that pet deer rifle, then try this appetite on four legs. Most farmers will be glad for you to shoot the garden grabber. My brother-in-law just informed me at this writing that another chuck is in his garden . . . ◆

A herring gull (left), a common species along our coast, rides the rising columns of warm air known as thermals. This female mallard will momentarily "lower its landing gear", cup the outstretched wings, and pitch down on the water's surface.



How Birds Fly

by Steve Price
Photos by the Author

DID you know that some birds can fly faster than 100 miles per hour? That one species of bird migrates over 20,000 miles a year? That some birds can even fly underwater?

If so, then you're well on the way to becoming an accomplished bird watcher. If you didn't, don't feel bad, for the mysteries of bird flight have baffled man for centuries. In fact, it wasn't until propeller-driven planes were developed that scientists actually learned how birds fly. Birds are actually living airplanes.

When man first tried to fly, he constructed large, clumsy machines (called "ornicopters") with mechanical wings that he flapped up and down with his own muscle power. One reason they never succeeded in getting off the ground was because the human body is too heavy, in comparison with that of a bird, to fly. Scientists estimate that a person weighing 150 pounds would need a breastbone six feet deep in order to hold muscles large enough to flap wings capable of lifting him off the ground!

A bird does not fly merely by flapping its wings up and down. The bone of each wing is actually in two parts, like our own arms. The bend in a bird's wing is the same as our own wrist. The outer part, or wingtip, is made up of primary feathers, and the inner portion of the wing, from the body to the "wrist", is known as the secondary or "arm" portion of the wing. It is composed of much stiffer, straighter feathers.

As a bird strokes its wings, the outer (primary) feathers act similar to the propellers of an airplane. They actually rotate slightly for a tiny fraction of a second. This forces air over the secondary portion or "arm" of the wing.

This air has further to travel than the air moving directly under the wing. The faster flow of air over the top of the wing causes a drop in air pressure above the wing. The result is lift.

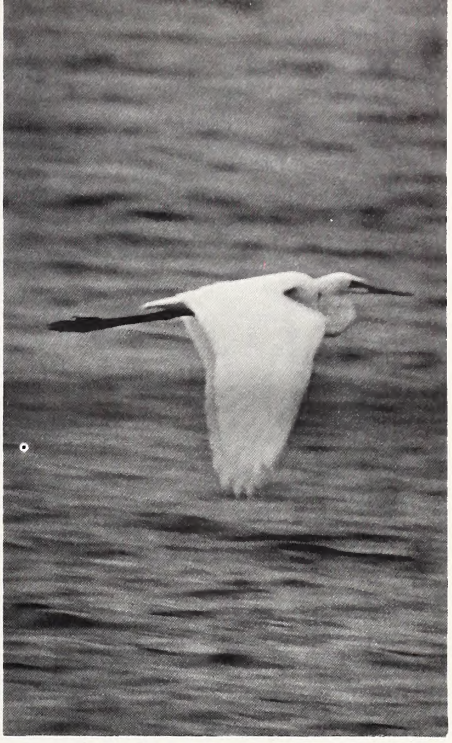
This is exactly the same principle that keeps a multi-ton jetliner in the air. It is known in physics as the Bernoulli Principle, and was first expressed by the Swiss mathematician in 1738.

As a bird tilts the front edge of its wings upward, lift increases. This is true only to a certain point, however, until the wing is nearly vertical. Then a "stall" occurs. Birds do this when landing. By raising the angle of its wings higher and higher, forward movement is slowed until this "stalling speed" is obtained. Next, the bird's "landing gear," or legs, are stretched down to absorb the shock as the bird touches the ground.

The next time you are out on a family camping trip, or perhaps just walking by yourself, you can observe these characteristics of bird flight, for birds are found everywhere. If you live near the seashore and are able to observe seagulls, however, you will be able to watch an entirely different type of bird flight known as soaring or gliding flight.

Soaring flight is quite different from flapping flight, and is practiced not only by gulls, but also by hawks and vultures and other birds that must spend many continuous hours in the air. For them,

Most birds are migratory to some extent; some, like these snow geese, making flights of thousands of miles. Streamlined shape helps make flight easier for most birds. And the outstretched legs of this American egret help act as rudders in flight.



soaring is one way to conserve energy.

When a bird such as a gull is gliding, scarcely moving its wings, it is riding an air current, known as a thermal updraft, rising off the ground or the ocean. A thermal updraft is caused when the air temperature is colder than the ground temperature.

As the cold air is warmed by the ground, it rises, creating the perfect highway for the birds. Strong winds occasionally blow these warm thermals over until they actually lie horizontal just above the ground. In effect, this produces a ridge of rising air on which birds can glide in a straight line.

PERHAPS if you have been on a fishing boat or a ferry, you have seen gulls following behind. They are taking advantage of another similar type of air current. The birds are riding the rising air currents created by winds bounced off solid objects and deflected upwards; these are known as obstruction currents.

Migrating birds also use a type of obstruction current during their long trips. As a bird flies, it creates behind it a small area of disturbed air. This is called a "slip stream" and any bird flying directly in it would probably be tossed around and unable to fly for very long. This "slip stream", however, also is a type of uplift, and wild geese and swans, by flying in V formation, use this to save their energy when flying.

In the V formation, each bird flies, not directly behind the other, but aside or above the bird in front. Each bird is resting its inner wing tip on the rising air caused by the bird ahead of it.

Being able to save energy during long migrations is important to a big bird like the Canada goose, which migrates yearly from Canada to the Carolinas and back again. But this is a fairly short migration compared to that of the arctic tern.

This amazing bird travels between 20,000 and 22,000 miles each year, nesting within the Arctic Circle and wintering within the Antarctic Circle. Scientists think the tern makes this flight in about 20 weeks, flying an average of 1,000 miles a week.

NOT all birds fly solely through the air. Some, such as the auk family of the Alaskan coast, actually fly through the water!

This unusual bird family, composed of murres (pronounced MURS), guillemots (GIL-eh-mots) and puffins, seems as much at home in the water as in the air. They dive from their nests on the steep rocky cliffs straight into the water. Once under, they continue to "fly" with rapid wing strokes, snatching small fish with their sharp bills. Some can remain under as long as two minutes.

Penguins can "fly" underwater better than any other birds. Their flippers are actually covered with many tiny feathers, but are very stiff. Their webbed feet are used underwater only to aid in steering. Although these birds inhabit some of the coldest waters in the world, those in the Antarctic, they have been clocked at flying 25 miles per hour underwater!

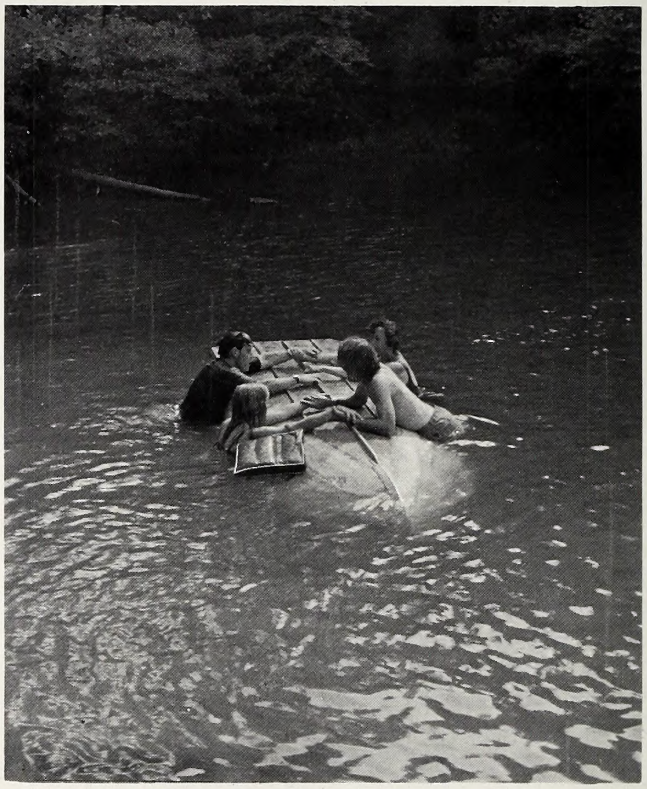
Penguins, however, cannot fly through the air, so they will never come close to matching the 120 miles per hour reached by a diving hawk or falcon. These birds don't always fly this fast—their average speed is probably closer to 65 or 70. Ducks and geese fly nearly as fast, and even the tiny hummingbird can speed to 60 miles an hour.

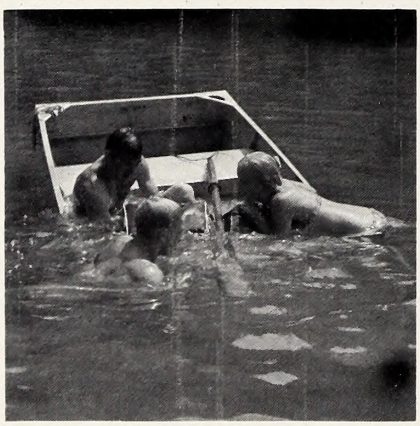
We still have much to learn about bird flight, despite our knowledge about flight speed and distances. It is a fascinating subject, and the best part about it is that you can study bird flight yourself right in your own backyard, a nearby meadow, the seashore, and even in a downtown park. You can pick the species of bird you want to study (there are over 8,000 species of flying birds) and even the type of flight! ◆

Stem to Stern

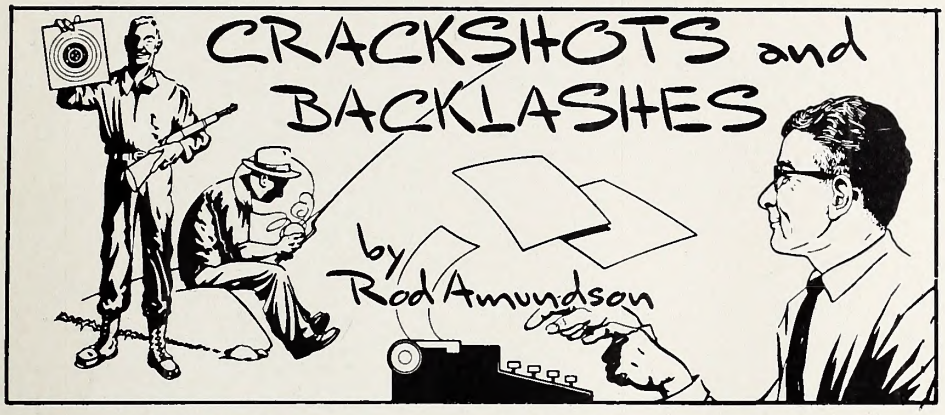
BY ED JENKINS

STAY WITH THE BOAT. This is a phrase that you've heard frequently from boating safety folks, but often is forgotten when things suddenly start to happen. These posed photos show what happens to a swamped or capsized boat: they float. Usually this is your best source of safety. Stay with the boat.





Most well-designed boats don't capsize easily, but if they do turn turtle (top right), lock arms as demonstrated. If you become too tired to hold on, wrists may be actually tied together. If boat is upright (above), seat cushions may be placed under seats and bow to provide extra buoyancy. Water then can be splashed and dipped out and the boat refloated (above right). Even full of water (right), this boat is being paddled to safety. Stay low and distribute weight evenly.



Against Trapping

Dear Sir:

I feel that it is my duty as a true sportsman to inform the Wildlife Commission that there is a commodity being sold on the market that can do more harm to the N. C. wildlife than all the polluting of the streams and of the air that is going on now.

Recently, I went browsing through a local department store that had just opened to the public. The new sport department carried a particular item that caught my eye more than all the other products in the store. Now I don't know what some people define as sport, but steel spring traps are not my idea of humane treatment of animals.

This commodity is now being sold like hot confetti. Anybody who has the inkling can go and buy himself as many of these traps as he wants and plant them around the countryside without having to obtain even a license.

I found one myself planted on my pond by a youngster who was getting his kicks catching any animal which happened by. This certain trap held in its steel clamp a young raccoon. The raccoon had gnawed its paw off in a futile effort to get away and was dying from starvation and pain.

I don't know whether someone is trying to make a lot of money in the steel trap market, or maybe the new department stores are getting swamped with too many goodies to notice. But sportsmen, hunter and fisherman alike, would like to see these steel traps taken somewhere other than earth.

Now if our legislators would really like to please the true sportsman and preserve what little wildlife there is left, they would enact legislation that would halt the sale of this evil trap on the open market.

Sincerely,
George P. Carr
Wilson

Pileated Woodpeckers

Dear Sir:

While reading *Wildlife* at the home of my son-in-law in Charlotte, I read a short article by a subscriber who had seen a Pileated Woodpecker near his residence, which made me want to tell of seeing six Pileated Woodpeckers in one of our large magnolia trees at one and the same time last fall. I think they were parents with four young ones. They were eating magnolia seeds which they love. We see two regularly in the fall. They also come to eat poke berry seeds before the magnolia seeds are red and popping out.

Yours truly,
Mrs. J. S. Kincaid
Morganton

NEEDED! Color transparencies of specific subjects, 35mm or larger. The Wildlife Resources Commission has urgent need of color transparencies of herds of deer in meadow, edge of forest or along stream or lake; flock of wild turkeys on roost, in forest or open grassy glade; wildlife families, adults and young near den, moving across roads, on trails, etc.

Transparencies must be **sharp,** color good, images reasonably large (medium close-up, in case of small mammals or birds). Mailed in protectors. Payment for use will be made upon acceptance and originals will be returned in good same-as-received condition after examination or use. No transparencies will be used without written permission and/or payment.

Send to:

Editor, WILDLIFE IN NORTH CAROLINA, 325 N. Salisbury Street, Raleigh, North Carolina, 27611.

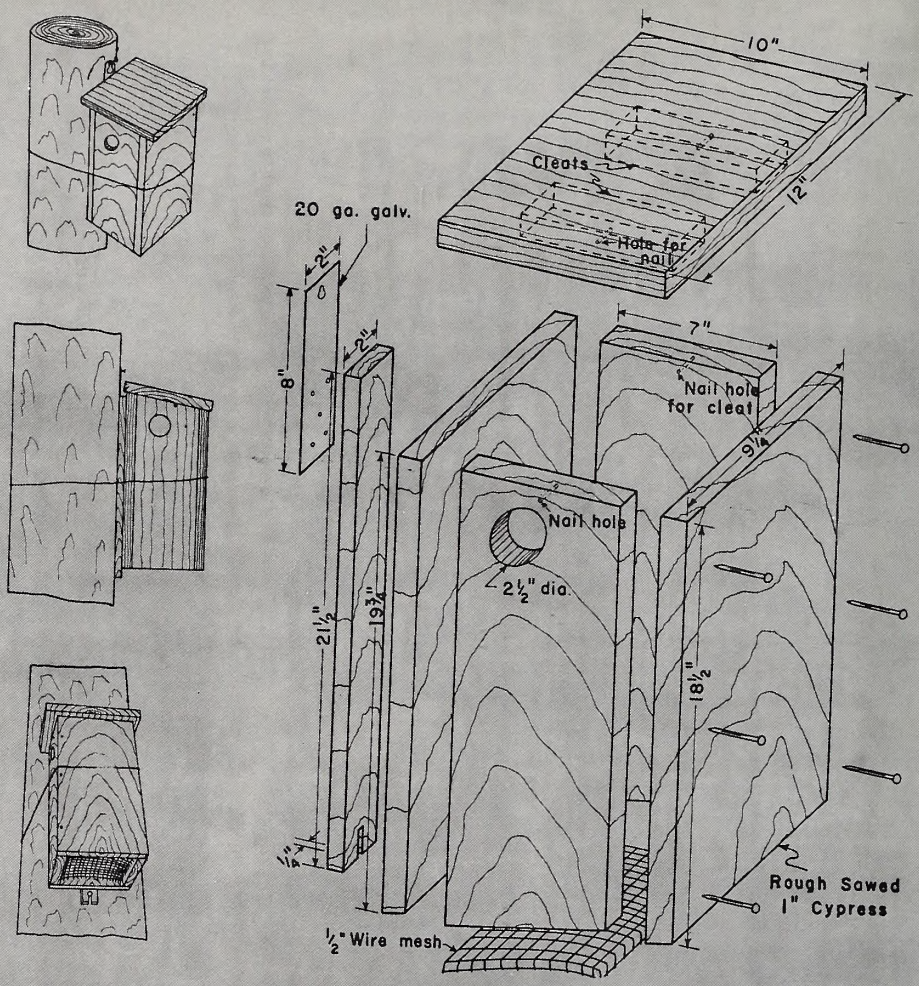
Gobblers — Gone?

Dear Sir:

I read the article entitled "Turkey Summer" (April issue), by John S. Wright, and I liked it very much. I liked it because it told the turkey's side of the story, and not the hunter's side, or the motorcycler's side. As Mr. Wright stated, jeeps and motorcycles are constantly disturbing the areas. How can people get by with ruining reproductive effort? It makes the work of people like Mr. Wright seem useless. Unless we get the co-operation of people who care about the protection of the wild turkey, this bird will never be restored to our state. Well, it's no joke anymore. The wild turkey is another animal that has felt the sting of our non-harmony with nature, like many before him. Man can live in harmony with nature, but now, since we have already taken out what we want, it's time to put back. With some effort on our part we can help restore this truly "great American game bird"—the wild turkey.

Robby Humphreys
Kinston

Squirrel Box



Actually the placement of squirrel nest boxes is best done in mid-winter, but perhaps this summer you might want to try your hand at constructing a couple. If you get them up by mid-June in a wooded area where fruit and nut trees are abundant, you may get some occupancy with late summer broods. The squirrels will thank you.

This squirrel box has several qualities that make it superior to previous designs. The shape, size, and location of the entrance discourages predators. The hardware cloth floor allows quick drainage and drying out, and lets old leaf fragments fall through. The box is easily removed from the tree for checking and maintenance.

When the box is constructed and erected according to directions, it is quite durable and long-lasting.

LIST OF MATERIALS

Lumber. 1" rough-sawed heart cypress or pentachlorophenol-treated pine is used to make the following sections:

Front and Back. Seven inches wide. Bottom cut square; top angled; 19¾" long on one side and 18½" long on the other. 2½" circular entrance cut in front with drillsaw, 14½" from bottom.

Side Near Tree. 9¼" x 19¾"

Side Away From Tree. 9¼" x 18½"

Roof. 10" x 12". **Cleats** should be just under 7" long. They should be located on the roof board so that they will fit fairly snugly inside the 7" x 7" box top, thereby preventing shifting of the roof. The roof should overhang sides about ⅜" and should overhang front and back about 1⅜".

Batten. 2" x 21½". Cut ¼" wide slot, 1" long, in center of one end.

Sheet Steel (for Hanger). 2" x 8", 20 ga. galvanized. Drill "keyhole," large enough to fit over 40-penny nail head, near one end; drill five nail holes, to fit shaft of 6-penny nails, near other end.

Hardware Cloth (for Floor). 8" x 8" square of ½" x ½"-mesh galvanized-after-welding, 14 ga. iron wire is preferred. Bend each side, ½" from margin, at right angles, to form 7" x 7" x ½" "pan."

Wire (for "steadying" box when mounted in tree). #10 solid, polyethylene covered THW conductor, or similar solid core, flexible plastic-covered wire.

Nails. 8-Penny Galvanized Box: 12 for box construction, and 2 to pin roof to box.

6-Penny Common Galvanized Box: 5 to attach hanger to batten, and 6 for cleats.

6-Penny Common Galvanized: 5 to attach batten to box.

40-Penny Common Galvanized: 2 to suspend completed box from tree.

Staples. 8 small galvanized, to attach hardware cloth bottom.

CONSTRUCTION AND ERECTION

Install floor after sides, front, and back have been assembled. Turn hardware cloth "pan" so edges point downward. Insert into bottom of box until wire edge is even with box edge. Staple.

After box has been assembled and roof set in place, drill one hole each through the top center of the box's sides (or front and back) and through roof cleats. Nails can then be inserted to secure roof.

Attach hanger to bottom by driving 6-penny galvanized box nails through hanger and bottom. Clinch projecting ends into batten.

Fasten batten to side of box by driving 6-penny galvanized nails through batten and well into, but not through, side of box.

It is important that you place 1" layer of dry leaves on wire floor.

Pick box location on trunk of tree, high enough to discourage vandalism or possible shot damage. Do not rest box on limb, as this will eventually damage tree and box.

Leave at least 2" clearance between tree and heads of 40-penny suspension nails to allow for tree growth.

Use single strand of plastic covered wire to make box mount sturdy. Pull wire taut around box and tree trunk and twist ends together. Wire will untwist as tree grows.

Computer Art

THE art of map making requires a good sense of perspective, gray values, colors, symbolism and pattern combination. The best map makers have much in common with outstanding designers. Therefore, I ask my students interested in computer mapping projects to draw a picture related to their project as an exercise for their later scientific displays.

Susan Gaylord made the first draft of the cardinal as such an exercise and she agrees that this is the way she learned how to choose the shading symbolism for her bird distribution maps (see *Wildlife in N. C., Sept. 1972).* Richard Reader and I took that draft and, after a long and helpful discussion with Duane Raver, changed the bird and twig and added a background to help make the bird come alive.

We present the cardinal as our expression of thanks to the many readers of *Wildlife in N. C.* who have helped us to make the N. C. Phenology Project a success.

Helmut Lieth
Dept. of Botany
U.N.C.-Chapel Hill

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 100,270

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 7 JULY, 1973

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An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

The herons and egrets (with the possible exception of the cattle egret) are pretty good fishermen. The green heron on our cover this month has just nabbed a minnow from a shallow water area. Showing more bluish-gray than green at times, this heron is a summer-long resident of North Carolina. Many nest along our coast and some stay all winter. Photo by Karl Maslowski.

Fresh-Water Sloughs: Gifts From Nature

by
Dwight L. Peterson
Clinton

NOT long ago, I stood alone on the banks of a slough and marveled at the mysteries and secrets it must hold. It was a sunny autumn day and the water was placid and the air crisp. Cypress, maple, oak, pine and other trees formed a hovering shelter over the slough. And a gentle wind loosened the summer grip of the leaves and they touched the water surface below with hardly a ripple. The mirror surface reflected autumn colors, and I watched the leaves move slowly over the water like tiny sailboats on a large lake.

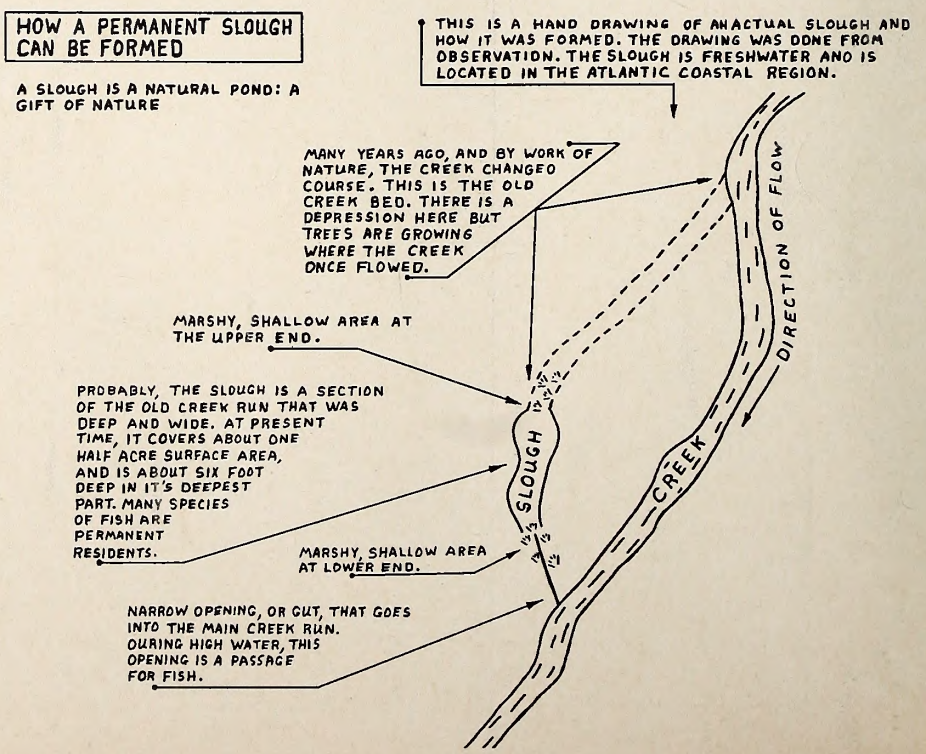
How ancient this small body of water must be, I thought. Man, with his bulldozers and other machinery, had nothing to do with its formation or creation. Nature, with patience dwindling over many, many years had sculptured this beautiful body of water. But within a matter of a few hours, man, with his machinery, could destroy this work that nature had so patiently designed.

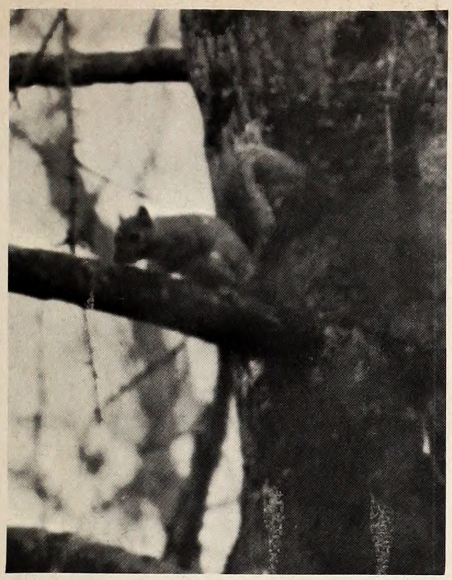
Sloughs, as this one does, form a very important part in the jigsaw puzzle of our natural wetlands. When we think of projects to channelize a certain stream of water, we should broaden our image of the stream to include the many acres of land area on each side of the stream. In other words, we should think of channelization in its broadest sense. Destruction of a stream and its natural life is not the only thing involved when channelization is proposed. Ask yourself, "What is channelization?" The answer? Drainage! And it is natural to assume the wet, swamp land bordering the stream is often the intended victim of drainage. This land area includes our sloughs.

What is a slough?

Very often, during conversation with others, I have noticed that some people refer to coves and bays as sloughs. This is not necessarily true because coves and bays are usually an actual part of the stream, river, or other body of water. They are tracts of water around which the land forms a curve. An indentation in the shore line, you might say, with the bay being larger than the cove. However, there are times when the cove is referred to as "a small bay." And this is correct.

SLOUGHS are a part of backwater from a stream and are not usually directly connected to the stream at all times. That is, they can be considered a separate part of the stream. During high water the stream level rises and the flood, or backwater, moves back into the low swamp land feeding





Sloughs and the accompanying habitat they create make ideal homes for many wildlife species. Squirrels, both fox and gray, nest and feed in the trees nearby, and raccoons find good feeding grounds in the water and in the surrounding wet areas.

and forming the sloughs. Looking further, we'll find that some sloughs are formed when a stream changes course. Or when a stream has a split run and one run ceases to function. This type of slough is usually called a cut-off, or ox-bow.

Actually, sloughs can be considered *natural ponds*. They are fed, replenished and kept alive by rain, runoff, seepage, flood water, or tide water. During dry seasons some of these sloughs, or natural ponds, or marsh (swamp) ponds as some may call them, dry up. Thus, we would classify them as temporary. Other sloughs can be classified as permanent because they never dry up. Some are very shallow and do support aquatic life such as plants and fish. But no matter which category the slough fits into . . . it's important.

As an example, let's look at the slough I mentioned at the beginning of this article. This particular slough is a cutoff from the main stream. Also, it is of a type that can be considered a permanent, natural pond.

At one time, many years ago, this slough was, or was a part of, the main stream which flows about one hundred yards from its south bank. Through a process of natural evolution the stream changed course, or if it had a split run, one run ceased to function. Slowly, time moved forward and parts of the old run began to fill in. Vegetation began to grow. A deeper, wider part of the old run became a permanent, natural pond . . . a slough. The only direct connection the slough now has with the present main run is during higher than normal water level periods, and this is usually often.

To be more specific with description, the old run between the upper end of the slough and the present main run has filled in. This area now supports vegetation (trees, etc.) same as the surrounding area. Land depressions are the only evidence supporting the fact that a stream once ran here.

The old run between the lower end of the slough and the main run is marshy. There are a few trees here, such as bald cypress, and a narrow gut that goes back into the present main run. The bottom of this gut, or marshy area, is the same level as the surface level of the slough and main run. When rains come and the water rises, this gut is the inlet and outlet for the slough. Although most of the fish in the slough are permanent residents, many species use this gut as an in and out passage during high water. For this reason, practically all species of fish found in the stream can be found in the slough. The whole affair is a cooperation between slough, main run, and nature. Like a marriage, once formed, it is a give and take proposition.

I have known this slough I have just described since boyhood. And there is a natural, personal attachment. It has approximately one half acre water surface area and was one of the main attractions in a forest-swamp-creek playground for the community boys. It was only one of the many sloughs along the creek, but somehow, it stood out among all the rest. Maybe it had an unseen, or unnoticed, beauty that we were not yet old enough to comprehend or explain. To us, as were the other sloughs, it was just a pond of water with plenty of fish. It did seem a little more productive, fishwise, so maybe this was one of the reasons we considered it a favorite.

Although some years have flowed under the bridge of time, I still visit this slough, but now I am usually accompanied by my wife and three children. Very little change has taken place through the years and the slough still teems with many species of fish. Earthworms can be dug from the rich, black, swamp soil surrounding the slough, and grubs can be found in decaying logs. In fact, many kinds of natural bait can be found without leaving sight of the slough. With a number eight hook, line, cork, cane pole and some of the natural baits, you can have a nice string of fish in a relatively short time. That is, if the fish are cooperating and the time is right.

But this slough is only one straw in a haystack. It is a near

replica of many hundreds.

To help reach a better understanding of the components that are pieces in the jigsaw puzzle of our natural wetlands, let's dip a little deeper. If you feel the urge to contradict my definition or description of a slough . . . I don't blame you. It may be where you live that makes the difference.

Actually, definitions concerning bodies of water differ from one region to another. A creek to one person may be considered a river to another. A branch may be a creek. A pond may be a lake. It is the same with sloughs. Definitions differ. Limnologists usually define a pond as a body of water so shallow that rooted plants grow completely across it, the bottom is usually covered with mud, and there is little wave action. On the other hand, a lake is too deep for plants to grow across it, but there are usually plants growing along the shore. The lake is larger than the pond and does have wave action. If we should stick to these definitions as guidelines, what would we call many of our *farm ponds? Farm lakes?* See what I mean?

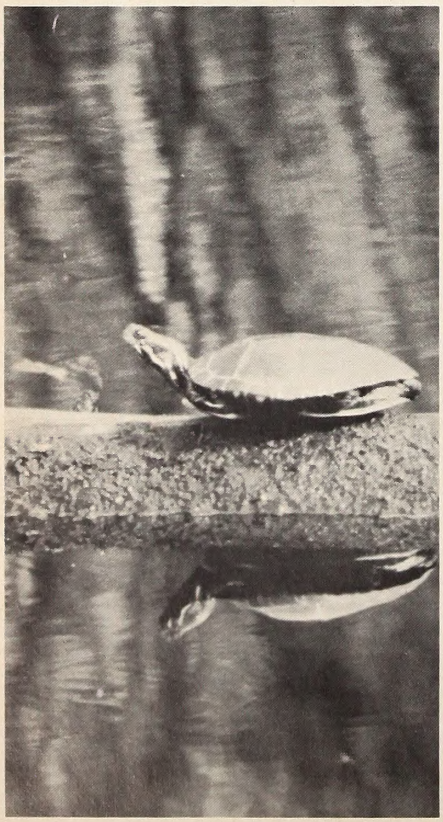
The most important thing we should remember about sloughs, or marsh ponds, or bogs, or whatever we may call them, is *not* the definition . . . , but their purpose, significance and prestige. These waters and their environs support, or make up a habitat for, natural life from microscopic organisms to bears.

As I said before, fish can be found in the permanent, deeper, stream-fed sloughs. If we should study the habits of our freshwater fish, we would find that many prefer the still, placid water of these sloughs to the moving water of the stream. Comparing this type of slough to the permanent, shallow slough, we find that the only difference may be no fish. That is, no large, or game type fish year round. Minnows? Possibly. But we should not claim the purposes of these sloughs are more important than the temporary slough, or the parts of a swamp that dry up during certain times of the year. Even here we find crayfish and other natural life.

HABITAT is the natural home of an animal or plant. Sloughs and the surrounding area *is* habitat. If we visit these areas as observers, we find they are the natural haunts of otter and mink. Muskrat mark the mud bars and sand shores with feet and tail tracks. Dens of many animals can be found in the banks. Raccoons root the slough edges for crayfish, grubs and earthworms. Squirrels perform aerial stunts in the trees. Turtles lazily sun bathe on partially submerged logs. Ducks and other waterfowl use these areas for feeding and nesting. Water birds, such as the herons, stand stiff as death in the shallows awaiting a fish. A deer glides like a ghost through the dark interior of the swamp. A horned owl swoops down on a marsh rabbit. There is more, much more.

Visiting this wetland world is very much like visiting any other part of our natural world. We quickly find we are accepted, and in turn we accept it. But when we destroy, we commit an act similar to cutting off a finger and expect the hand to perform as it did before. ⬍⬍

Wetland areas such as sloughs have many values that are not apparent at first glance. Maintenance of a high water table in the surrounding land is but one of these values.



The Future of Canada Geese in North Carolina

Jack Donnelly
Waterfowl
Biologist
Otto Florschutz
Bureau of Sports Fisheries
and Wildlife
John Davis
Refuge Manager

MATTAMUSKEET—the rhythmic softness of the Indian name meaning "Dry Dust"—recalls the days when the Algonquin Indians silently hunted the forest that once grew where Mattamuskeet Lake now stands. Explaining the origin of "Dry Dust", some say uncontrolled fires burning deep into the peat soil formed the lake. Another account describes Mattamuskeet Lake and the nearby smaller Alligator, Phelps, and Pungo Lakes as being scoured out by a shower of meteors that struck the Carolina coastal plain.

Here in this coastal region stretched many dense stands of pine, cypress, and gum and open spaces where the wind blew over seas of marsh grass. The Indians are now gone, leaving few traces upon the land they once knew, and much of the forest has given way to agriculture.

Mattamuskeet Lake was little disturbed until the early 1900's. Several initial attempts to drain and farm the lake resulted in failures mainly because of inadequate financing. It was not until 1925 that a serious effort was made to reclaim this land for farming operations when August Hecksher, a philanthropic Dutchman, bought the entire lake bottom and formed the New Holland Corporation.

The corporation constructed the then "world's largest" pumping plant as a means of keeping the lake area dewatered. It placed 9,000 acres of the lake bed and adjacent marshlands under cultivation, and produced bumper crops of soybeans, rice, buckwheat, popcorn, lespedeza, barley, celery, asparagus, rye, oats, flax, and potatoes. However, Hecksher's dream of creating a "New Holland" never fully materialized. Beset by pumping difficulties, excessive rainfall, and agricultural pests, the farming operations edged closer to defeat with each successive season. In 1933 matured crops remained unharvested, some knee-deep in mud and slime, while water in the fields continued to rise because of pump failure. Hecksher gave in to the elements, and the New Holland Corporation ceased to exist. Fish and wildlife that had been temporarily displaced during man's efforts to change the natural environment returned as the lake waters rose to normal levels.

• A new era came to Mattamuskeet in 1934 with the Federal purchase and subsequent assignment of the area to the Bureau of Sport Fisheries and Wildlife for stewardship. The Bureau received 49,925 acres of water, marsh, and timberland in the original transfer and an additional 252 acres in 1939, bringing the total refuge size to 50,177 acres. Waterfowl came to Mattamuskeet to feed upon the dense stands of bulrushes, spikerushes, panic grasses, millets, and smartweeds in the marshes and shallow water flats and the muskgrasses and pondweeds in Mattamuskeet Lake.

Following the establishment of Mattamuskeet as a wildlife refuge, the goose population steadily increased. From 1940 to 1948 the wintering population fluctuated between 30,000 to 50,000 geese. Beginning in 1949 an increase began which resulted in a peak of 144,400 birds by 1959. Following this rapid increase in the goose flock, a large and thriving recreation industry developed in Hyde County. Motels were built, blinds established and local hunting guides thrived with as many as three shooting parties a day. Soon hunting became a major industry and Mattamuskeet Lake became known as the goose hunting capital of the world. However, following the peak year of 1959, the wintering flock began to decline sharply. Today the wintering flock is a remnant of what it was eleven years ago.

Not only has the Mattamuskeet flock been affect-

ed, but there have been reductions in all of the other N. C. flocks. For example, midwinter survey data since 1951 indicate the Anson County flock is now 73 per cent below its long term average. Similarly, Chowan County is down 77 per cent, Perquimans down 89 per cent, Beaufort 75 per cent, while the Camden flock has almost ceased to exist.

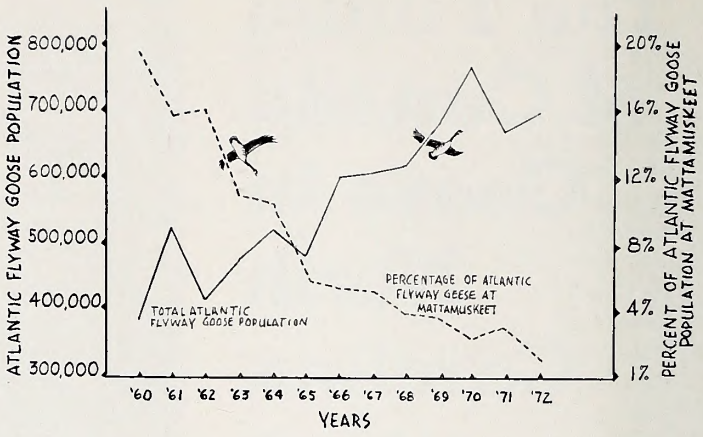
The birds in Washington County are in somewhat better shape, having been reduced about one-third, while the Dare County flock is down about 21 per cent. Only the flocks in Carteret, Currituck and Tyrrell seem to be holding their own, and they are now averaging 4 per cent below their long term average.

During this same period when N. C. has been experiencing a decline in the number of wintering geese, the Atlantic Flyway population has continued to increase. In 1951, the winter survey indicated a Canada Goose population of 495,000 in the entire flyway, while the 1972 survey revealed a count of 462,000 in Maryland alone. The flyway total is now 770,000 or 57 per cent above the 1951 survey. These figures are midwinter estimates taken on a Flyway-wide basis immediately after the annual hunting season. Therefore, the populations presented are those birds that survived a 20 to 30 per cent harvest and actual Flyway pre-season Canada goose populations probably approached 1,000,000 birds during this period.

It is interesting to note that of the 16 states in the Atlantic Flyway reporting Canada Geese on the midwinter survey in 1951, only three show decreases in 1972: North Carolina, Georgia, and Florida. South Carolina, which reported a substantial increase in 1972 over the 1951 population due to the build-up of the Santee flock in the late 50's and early 60's, is now reporting a sharp decline from their peak year in 1964. According to the midwinter survey, the South Carolina flock has fallen 66 per cent below its peak year while the Florida flock is down 96 per cent. In other words, every state south of Virginia has been losing geese while the more northern areas continue to increase their wintering flocks.

The Atlantic Flyway distribution has changed considerably. Table 1 shows that at the beginning of the period, and until 1964, from 50 to 60 per cent of the goose population was in the Delmarva area (of Delaware, Maryland, New Jersey and Virginia), and 37 to 48 per cent were south of there while less than 5 per cent were north of Delmarva. During this same period, from 30 to 40 per cent wintered in North Carolina alone with 10 to 20 per cent of the total Flyway population at Mattamuskeet Lake.

Starting in 1965, however, a shift or shortstopping of southern geese to the Delmarva area began with no change in populations north of Delmarva. That year 68.5 per cent stayed in Delmarva and 27.7 per cent went south with 20.6 per cent wintering in North Carolina and 6.1 per cent at Mattamuskeet. The slide had started and progressed each year thereafter to a Delmarva high of 85.3 per cent in



1970 and southern flocks consisting of only 11.4 per cent with 9.2 per cent in North Carolina and 2.3 per cent at Mattamuskeet, and still no difference north of Delmarva.

In the next two years, however, intensive Canada goose management in the northern part of the Flyway (particularly in Pennsylvania, New York and Massachusetts) began to show further redistribution of the Flyway population. At the expense of both Delmarva and further southward flocks, the northern areas in 1972 had 11.5 per cent of the total Canadas, Delmarva 81.9 per cent and areas south only 6.6 per cent with North Carolina having 5.2 per cent and Mattamuskeet a mere 1.8 per cent of the total Canada geese in the Atlantic Flyway.

• Several reasons caused this quite sudden shift in the Atlantic Flyway. As mentioned, Pennsylvania and New York have spent millions of dollars in goose management in recent years. Acquisition of large tracts of agricultural land in eastern Pennsylvania just a few years ago, establishment of captive flocks, intensive small grain farming and limited hunting have been done on both the State and private level, causing more and more birds to delay or discontinue completely their migrations to southern areas. Changes in farming practices in North Carolina and on the Delmarva Peninsula have been a major factor in the redistribution of Flyway goose populations. Eastern Shore counties in the past had extensive vegetable farming operation. This was a profitable enterprise because the area was so close to the metropolitan centers of the east; but much corn had to be imported into Delmarva from the corn-belt states. In the mid-1960's the high cost of hand labor to harvest truck crops and other factors caused a shift to corn and soybean production. By 1968, Delmarva was producing all the corn it needed for itself and was exporting millions of bushels to foreign countries and surrounding states.

During these same years, other changes in farming methods were taking place in eastern North Carolina, especially where the major goose concentration existed, Lake Mattamuskeet. Here, farmers were looking towards an expanded truck farming

operation to supplement a sagging corn and soybean economy and more potatoes, carrots and cucumbers were planted each year. Some large acreages of celery and sweet corn were tried for several years during the mid-1960's. A severe hurricane in late September one year during this period caused losses of around 50 per cent to the feed corn curing in Mattamuskeet fields. This was good for the geese that winter but caused many farmers to invest in grain bins and driers.

From then on, earlier and earlier varieties of corn were being planted with major harvest taking place in August and September rather than October and November as previously. Of course this earlier harvest meant earlier disking and plowing of the stubble and planting of winter cover crops. This practice along with warm August and September days following the corn harvests caused burying, sprouting and rotting of remaining corn and were not available for gleaning by arriving and wintering geese.

There is no doubt that excessive hunting pressure and skills contributed to the Canada goose reduction in the Mattamuskeet area. At Mattamuskeet we have been collecting various goose kill and hunting pressure data since 1959 and have had the opportunity to measure daily and annual differences. For instance, the high goose population years of the early 1960's resulted in tremendous hunting efforts in excess of 10,000 hunter-days being expended annually. Of course, with this high effort, goose kills were exceptionally high running from over 5,000 to nearly 12,000 harvested each year and hunter successes averaging from two thirds to over one goose per hunter per trip. Consequently, we experienced annual kills up to nearly 25 per cent of the average in-season goose population at Mattamuskeet.

Several factors during this high kill and pressure period contributed to the already high harvest. Hunters, not satisfied with not obtaining full limits of two birds daily, requested the State Legislature to increase hunting hours from sunrise to sunset rather than a County 4:00 p.m. statute already in existence for a number of years. So this was passed and put into effect prior to the 1961-62 season. The season length was extended by the Bureau of Sport Fisheries and Wildlife from 60 to 70 days in 1963-64 and the daily limit was raised from two to three geese in 1964-65. Additional hunting blinds were constructed both on and off Mattamuskeet National Wildlife Refuge.

Several indications became evident late in this period giving evidence that the geese were not going to withstand this constant and increasing punishment. Large flocks of geese countered the sunset shooting hours by flying to and feeding in surrounding private fields late at night, even including periods of the darkest nights. Others changed their feeding times to go to the fields and feed between 11:00 a.m. and 1:00 p.m. when hunters normally left the blinds for lunch. Other geese left the area to feed in Pamlico Sound to the south and to the Pungo, Phelps, Alligator Lakes areas to the north and east. But most of all, and each year thereafter as shown in Table 1, fewer and fewer Canada geese came south of Delmarva where feeding conditions continued to improve.

Another factor favoring the Delmarva area was the near proximity of the Delmarva area to the hunter population. In Delmarva, where large metropolitan areas exist and most hunters live, guides and landowners soon learned that high goose hunter success can be continued by periodic rather than continuous daily effort. In the more isolated eastern North Carolina area, goose hunters came and stayed for a number of days of hunting. The result was constant effort in and around Mattamuskeet from Monday morning to Saturday night throughout the season. Only on Sunday and well after sunset could Mattamuskeet geese obtain a free meal. We have daily goose kill data on hand that show Mondays as the most successful harvest day and succeeding week days progressively less successful with Saturday the least successful day. This suggests that the non-hunting Sunday rest reassured the birds that the harrassment was over.

• The situation at Mattamuskeet is by no means unique. Historically the gulf states wintered many Canada geese but through intensive management the flocks were moved steadily northward until today the bulk of the flock is located in Illinois and Wisconsin. Now the problem has appeared in the Central Flyway with more and more white geese refusing to migrate to the Gulf Coast and instead terminate their flight in states farther north. In spite of the best efforts of state and federal biologists they have been able to do little to alter the situation. Consequently it is not unreasonable to assume the more northern states and even southern Canadian Provinces will begin an attempt to move the wintering flocks even farther north. In fact, the process has already begun. In reality it seems to make little difference whether the various state agencies avow or disavow this approach since private landowners have learned to "farm for geese" as efficiently as the professionals.

What this means to Mattamuskeet Lake, Hyde County and to the entire south is that the "good old days" are gone forever. Never again will Hyde County be known as the goose capital of the world. In fact, if we are not careful, the remnant flock at Mattamuskeet can easily become like the flocks in Florida, now down to less than 1,000 birds. Thus we have come to a point in time where the welfare of the birds must come first if we are to save anything at all.

In the future, other types of hunting must be promoted in Hyde County which abounds with doves, ducks, quail, woodcock and other small game. These efforts should be substituted for some of the continuous hunting of Canada geese. This new approach will be necessary because there are

• continued on page 27

The author, complete with blisters and hiking staff, surveys the mountain beauty along the Trail.

WALK THE APPALACHIAN TRAIL

by Peter H. Dunning
Photo by the Author

The following excerpt is expanded from an entry in the journal I kept during my Appalachian Trail walk of 1971. The entry was made late one night in May from a campsite on the trail, north of the Great Smoky Mountains Park and near the Tennessee-North Carolina Border.

I am writing this in the dark with the flashlight held in my mouth to see.

It was late when I finally made camp (8:30); I gulped down hastily made supper and went right to bed, tired from a long day.

For some time I lay on myback watching the stars appear and disappear from behind fast moving silent clouds. A night bird shrilled its cry into the darkness: hunter or hunted, I wondered. And from the pond closeby began a great gathering of frogs.

Within moments a few frogs became a few hundred and the once silent pond was transformed into noisy debate. The night became festive and lively, as if this were a large frog family reunion where the relatives apparently hadn't seen each other for some time. I listened in awe.

You will remember I had eaten my supper quickly; naturally enough, I was now beginning to pay for my haste with the gassy pains of indigestion. Much to my relief, I belched loudly.

Instantly the frogs were quiet. There wasn't a sound. My belch seemed to echo from one group of frogs to the next like bad news; then the pond was quiet. We all kept still and listened.

Then from across the pond came a tentative croak, hesitant and questioning: (What was that?) It was answered by a barrrump: (I don't know.) And then a few more croaks: (Did you hear that? What was that?) and a peep: (It sure sounded big.) Soon the pond was back to its normal din.

And now here I lie, hours later, wide awake. I wonder if these frogs are ever going to sleep . . . . .

• During five months of the spring and summer of 1971, I walked the Appalachian trail, the continuous 2,000 mile footpath that runs from Georgia to Maine. When I finished, I had the feeling (without actually saying so, I guess) that now I'd really done something.

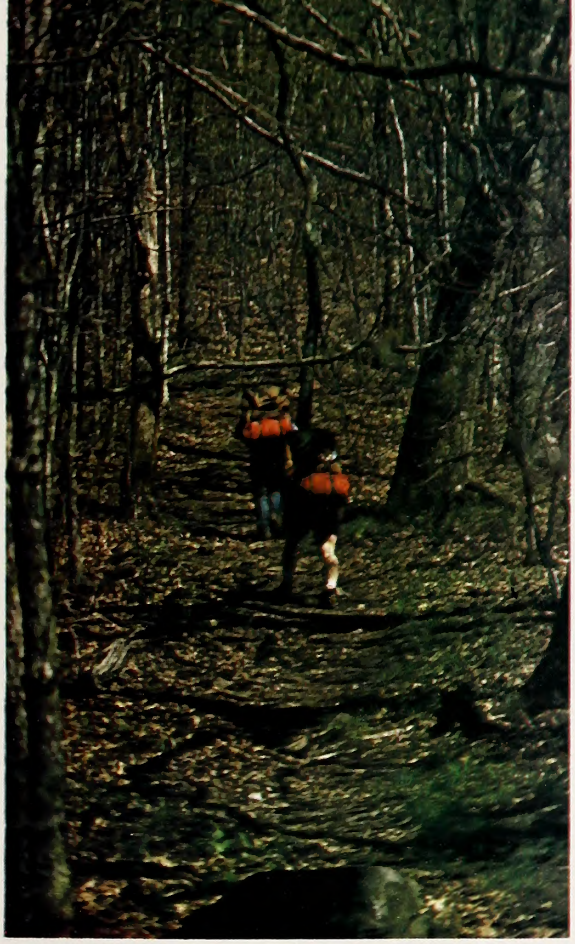
Since then, I've met five people who walked the AT in their sixties or later, and I've heard about numerous others, including an 83 year old grandmother of 23 who walked the trail three times, at 65, 67, and 72. The chances that I'd ever be able to do anything approaching that are about as good as my chances of becoming a grandmother.

In the 50 years that it has existed, the Appalachian Trail has been walked on by many people for many reasons. Some come for a few hours, some for months; some hike on it for the challenge of the great outdoors, some for solitude and quiet, some just for exercise. Recently one man admitted to me that he regularly walked on the AT because it got him "out of the house."

For whatever length of time or reasons, many people use the AT. And it is important for just that reason . . . because it is there, available within a day's drive to 150 million urban-bound Americans.

I would like to share some of my walk with you, the days I spent on the AT in Tennessee and North Carolina. I will describe the highlights of the trail as I remember them, beginning at the Georgia-North Carolina line and proceeding north along the trail 339 miles to the Tennessee-Virginia line. My hope is that in sharing some of my experiences, you will perhaps share my conviction in the inestimable value to our country of the Appalachian Trail.

The reason for considering the



The Appalachian Trail provides just about every variety of hiking situation imaginable, from woodland flats (upper left) to steep slopes. Falls on Laurel Fork Gorge sparkle in the summer sun. Ice Water Springs shelter is one of several scattered along the Trail.

Tennessee and the North Carolina sections of the trail together is that for almost half the 339 miles they coincide. The AT generally follows the Tennessee-North Carolina state line from the Great Smoky Mountains Park to just beyond Roan Mountain, or about 150 miles. As the two states share this much of the trail, the common practice is to discuss the two sections as one: the Tennessee-North Carolina section of the AT.

The Nantahalas (54 miles)

Georgia almost killed me. I had never been backpacking before I set off on my AT hike and the on-the-trail "breaking in" period I had allowed for felt more like a "breaking up" period. During those first weeks, my feet, legs and back were painfully articulate in protesting the new demands being made of them; more than once, I came within a coin's flip of chucking it all and going home.

May 7th was something of a memorable day. It was ten days and 80 miles since I had hobbled

off from Springer Mountain, Georgia, the southern end of the AT. On this day I entered into North Carolina with high spirits at passing my first state line . . . one down, thirteen to go—a real milestone.

Also, on May 7th I entered the Nantahala Mountains, truly one of the more enchanted sections of the trail. This southwestern part of North Carolina was, and in part still is, the ancestral home of the Qualla Cherokee, one of the most advanced and civilized of the native American peoples. The word "Nantahala" is Cherokee and means "Land-Of-The-Noon-Day-Sun." Some of the lasting beauty of this land is sug-

gested in the music of a few of the Cherokee names that still remain, names like "Cheoah," "Tusquitee" and "Nantahala" itself.

Finally, the evening of May 7th was memorable in that it brought me my first storm. I was prepared for the rain and the cold—the storm found me safely in one of the trailside lean-tos in my warm down sleeping bag. I was not prepared, however, for the overwhelming splendor and magnitude of a nighttime thunder storm in the forest. A wind rolled thunder in from the south until it cracked the trees about me with its roar; the rain poured rivers onto the earth and lightning strobed moments of turmoil as huge limbs of the trees twisted and thrashed in the storm. The storm lasted all night long; in the morning I was weary from the excitement.

In the remaining four days in the Nantahala Forest, I followed the trail over the horseshoe shaped main ridge of the Standing Indian (5,498 ft.), the Wayah and Wesser Balds (5,336 and 4,627 ft.) to the Nantahala River crossing at Wesser (1,723 ft.). To this day, my memory is flecked with the marvelous colorful names the first settlers gave to places I passed through: Big Kitchens Knob, Chunky Gal Mountain, Bear Pen Gap, Albert Mountain, Burningtown Bald and Licklog Gap. These names all echo history, a personal history of remote places where the living connection between man, animal and the land is still strong.

Cheoah Mountain (25 miles)

The Cheoah Mountain-Yellow Creek section is reputed to be one of the most strenuous and difficult along the entire Appalachian Trail. It lived up to its reputation for me. Cheoah Mountain is between the end of the Nantahala Forest at Wesser and the beginning of the Great Smoky Mountains National Park at Fontana Village.

It took me two days of 'serious' walking to reach Fontana. It rained the whole time and I always seemed to be looking either straight up or straight down the steepest, muddiest slope I'd ever seen . . . or anyway, that's how I remember it.

The Smokies (64 miles)

Fontana was my first scheduled supply stop since I had started and I was ready for it. After a full day and a half of reading and writing letters, resupplying my pack, eating giant meals at the restaurant and taking showers, I returned to the trail and entered the Great Smoky Mountains National Park.

Within the Park, the Appalachian Trail is the boulevard of all hiking trails . . . it is beautifully constructed and maintained along the highest and most rugged mountain range in the East. The trail in the Smokies also gets more use than almost any other section of the AT, but more will be said about that later.

I had been warned that it rained quite a bit in the Smokies. My pace was slowed considerably while in the park by a triple-decker blister on my right heel, thus I was in the park for six days (64 miles.) It rained four of those six days. However, the two sunny days made it more than worthwhile as the rain made the fresh colors and odors of the new spring in the mountains more intense.

As mentioned earlier, it is in the Smokies that the AT begins to follow the Tennessee-North Carolina border, off and on, for almost 150 miles. It gave you kind of a Paul Bunyon-feeling, standing on the highest bit of ground in any direction for almost 2,000 miles with one foot in Tennessee, the other in North Carolina, Georgia behind you, heading for Maine. Except I don't suppose Paul Bunyon got blisters . . . .

The Pisgah Forest (60 miles)

Between the Smoky Mountains Park and the Virginia line, the Appalachian Trail is alternately within the purchase boundaries of either the Pisgah National Forest (North Carolina) or the Cherokee National Forest (Tennessee.) Of this, the first 60 miles of the AT is known as the Pisgah section, and the remaining 135 miles as the Cherokee section.

Leaving the Park at Davenport Gap (1,975 ft.), the AT crosses the Big Pigeon River and then makes a long steep climb of Snowbird Mountain (4,263 ft.) From there, the trail goes up and down over Max Patch, Walnut, Bluff and Deer Park Mountains before coming to the crossing of the French Broad River.

Here at the French Broad, the AT passes straight through the center of Hot Springs, North Carolina, a once small but well known spa resort. This was my second scheduled supply stop, and once again I took a day off for correspondence, showers and hamburgers. This may sound odd, but one of the bits of wisdom I discovered during my 2,000 mile, five-month walk was that nothing puts perspective on a week in the wilderness like a good cheeseburger with lettuce, tomato and mayonnaise, some french fries and a coke. Add home-made apple pie with some vanilla ice cream and boy howdy!!! it can rain for a week and you'll make it.

My trail journal reminds me that this section of the trail before and after Hot Springs was characterized by "rolling and forested hills set about with picture book farmlands and nice country folk who were always ready to talk about rainy weather and snakes." I also remember having to climb an endless series of barbed wire fences (with posted permission of course), a cautious endeavor carrying a forty-five pound backpack.

The Cherokee Forest (135 miles)

I began this last section of the AT within Tennessee and North Carolina on May 25th, completely unaware of some of the surprises that were in store for me. First were the "southern balds", great elevated domelike mountains whose treeless and grassy summits afford incredible views of the span of the southern Appalachians.

Foremost in my memory is Big

• **continued on page 26**

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

North Carolina Authors

Three native Tar Heel conservationists have come out with two new books, "The World of the Gray Squirrel", and "The World of the Wood Duck". Dr. Fred Barkalow is co-author of the first one, and Gene Hester and Jack Dermid teamed up on the second book. Details on page 25.

National Farm Safety Week

The week of July 31 has been officially designated National Farm Safety Week with the theme "Falls Hurt—Be Alert". The Wildlife Commission lends its support to this important observance since falls can be serious while hunting, fishing or boating, as well as in the home or at work.

Striped Bass Production Successful

Despite a late, cold spring, heavy rains and high water, the striped bass hatchery at Weldon had a highly successful year. During one "run" of fish, more ripe eggs were brought in than hatchery facilities could handle. Many of the eggs were fertilized and returned to the river. Hatchery-produced fish were sufficient to meet commitments, some stocked as fry and others developed to fingerling size.

Don't Forget to Renew That License

Tarheels who have been using a combination hunting and fishing license are reminded that these expire July 31. The same is true of state hunting licenses. State resident and nonresident fishing licenses are valid on a calendar year basis rather than the fiscal year.

Reminder to Boaters:

Don't just think you are a salty old tar—Be One!

National Safe Boating Week is July 1st to July 7th. For free literature on safe boating, write Boating Safety, Wildlife Commission, Raleigh, N. C., 27611.

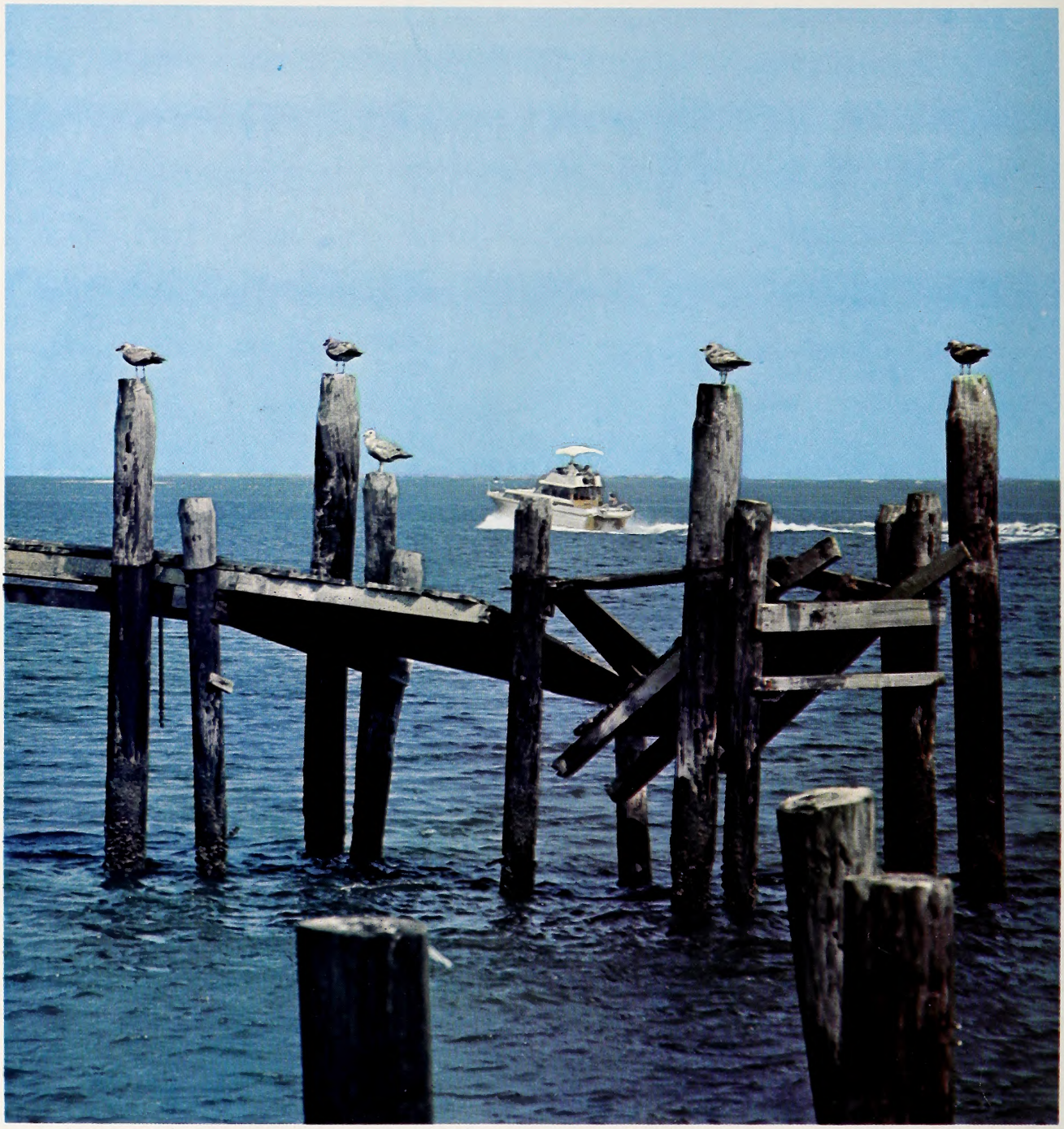


PHOTO BY JOEL ARRINGTON

BOAT TRIP

by Roy Martin

THE sign was red-lettered on white, proclaiming: "Deep Water Fishing."

Simple enough, well-stated with no nonsense.

And the boat. It was well over 40 feet, with gleaming white finish, its crew running about handling last minute details, rigging rods and stowing beer.

Serenity? Ah, yes. It was the stuff of visions—of blue water and big fish tugging heavily at tackle, bringing back memorable images from "American Sportsman" or tales of Hemingway and entourage aboard Pilar off Cuba.

But visions, alas, belie realities.

The boat was pleasant enough. There was a crewman

Fortunately, few off shore jaunts end up like this one. Weather does present some challenges, though. We hope your trip is smooth and fishy.

cutting bait on a hatch-cover and the captain in the wheelhouse barking instructions. The ropes dropped from worn pilings and the engine—with its muscular-sounding roar—became louder and the boat began backing out of its berth.

"Makes you think of Richard Widmark or John Wayne or somebody," said the fanciful landlubber on the left.

"Don't give up the ship!" he yelled into the roar of the engine. Then he laughed at his own foolishness.

The boat turned into the wind and headed out through the inlet. The ocean stretched ahead.

"Boy, just take a look out there. Look at that horizon line," said another neophyte. "It's got funny bumps on it." He laughed too and went for a beer.

At first it was great fun. The spray was exhilarating and even the most particular-seeming of the group didn't appear mindful of flying hair and water-spotted clothes.

But then came the "funny bumps" on the horizon. They were (a good estimate) 18- to 20-foot swells. The captain (likened to Ahab some hours later) never slowed his engines, the quest for fish apparently too enticing.

The short fellow who had taken enough "Dramamine" to take care of any situation was the first. Out of sight for awhile, he appeared from the cabin, pale and shaking.

He lurched towards the back of the boat. For awhile, all you could see was the feet.

Then came the girl who had raved about how good the box lunches were. Over the side.

That did it. Even the strongest—if he hadn't been considering the possibilities—was susceptible to a critical reevaluation of the situation.

So you sit on a hatch.

"Get in the middle of the boat." That was the one who claimed to have been in the Navy. "That way it won't be so bad. You can watch the movement of the boat in terms of the waves."

Intellectualistic bunk.

But it's worth a try. And soon everything gets significantly worse. The 18- to 20-foot swells seem to develop 1,000-foot troughs. Looking up, the waves are mountains, poised to crash down. Doooown. Then uuuppp. Dooown. Et Cetera.

"Well," said the chipper female program chairman. "We're going to fish."

But nobody stood up. They were all lying about the boat, staring blankly into space like the gaunt men of Andersonville, wondering why fate had been so unmerciful.

"We're going to troll awhile," said the mate, who insisted on propping a few people up and sticking fishing rods into their hands.

"Now this is where the fish are," he explained. "Our fish finder said so," He laughed and grinned toothily, almost menacingly, his eyes sweeping over the bodies littering the deck.

Trolling did it. The 18- to 20-foot swells became bottomless and looking up, there was nothing but a profusion of tidal waves. For once you clearly understand the frailties of man.

You'd like for this to be a private matter. Besides the rails are crowded.

So you run to the "head." But, alas, the door is closed. Occupied.

There must be a way. You talk to yourself. This is not real, you decide. You got caught in a whirlpool bath and someone will come soon and turn off the switch.

For awhile, that helps. But you are compelled towards refuge again. The door is still closed.

"He's been in there a right long while," said one of the crewmen, leaning down through a hatch.

You yell. "Hey, in there! You all right?"

"I say, you in there, when are you coming out?"

At first the voice sounded a little foreign, like Peter Lorre speaking from the bottom of the stairwell in the United Nations Building.

"I can't," was the faint reply. "I can't stand up. I think I'm dying. Call a doctor."

It was beetle-eyes. He had been the one who had been:

"Really looking forward to that boat trip."

"Anxious to have my picture made with a big fish."

A real boat buff.

Possessed of a "cast-iron" stomach.

With the door closed, you conclude that privacy is based on the first-come, first-served concept.

So it's back to the deck. You aim for the back of the boat. More talk to oneself. Quotations come to mind: ". . . when all about you are losing theirs . . ."

No good.

Then comes the word. "We're turning back." It sounds like a Grade B movie, but it's welcome. You grab a seat on the middle of the boat and look backwards. Optimism returns.

None too soon, the shoreline reappears, then buildings, the inlet and gratefully, the dock.

The crewmen tie up the boat and go off snickering about how everybody got sick and scared the fish away. But it really doesn't matter because after a time the ground stops swaying and ruppling and everything returns to a semblance of normality.

"But what am I going to do?" The question came from the ever-chipper program chairman. "I still have 35 box lunches left over."

Beetle-eyes, still pale and shaking, but somehow resurrected, turned his eyes seaward and with agonizing insight borne of obvious hardship said:

"Imagine. You leave with 35 box lunches and return with 37."

Barf. ◆

Stem to Stern

BY ED JENKINS

In spring and early summer many localities are apt to experience rain and wind storms of considerable force. When these strike, invariably a few moored boats drag their anchors and are then headed for trouble.

Choosing and using anchors is a lot like choosing and using fishing lures: Unless one knows enough about anchors to make a well-reasoned choice, the chances of getting good results from a haphazard selection are rather small.

It's convenient to say that a boat of such-and-such length should have an anchor of a certain weight. But there is more to it than this. Small outboard motors are often used to propel square-stern canoes eighteen feet long. Obviously such a canoe is lower, slimmer and lighter than an 18-foot outboard or stern drive boat having a cathedral or deep vee hull. An anchor that will hold the canoe in a storm obviously may not be able to hold the powerboat except perhaps in calm seas.

Seamen use the word "windage" in referring to how much wind drag a boat will experience. Obviously a sailboat with its tall masts and rigging will have more windage than a powered runabout of similar hull bulk. Equally obvious, a high-sided houseboat will have more windage than will a pontoon boat of similar length.

The nature of the lake or river bottom also affects anchor holding power. A rather small grapnel will hold a sizeable boat if it catches on coral. Clay and gravel bottoms will hold any anchor better than will loose sand or silt. The variety of bottom conditions to be found is one reason why so many anchor styles are made. Another reason is the variety of operating and storage conditions which anchors must meet.

While as a rule, any heavier anchor will hold better than a similar one of lighter weight, it's a fact that weight alone is not a reliable guide to holding power. Of greater importance is the anchor's design. Some have more working area than others in their blades, while others tend to bite into the bottom quicker or deeper.

A book could be written on choosing anchors. A good marine dealer can be of much help in making a quick but happy choice. It's also helpful to see what other boat owners are using in your area, in boats similar to yours. Larger craft often carry two anchors, a light one that is easy to use for short stops in fine weather and a bigger one that can be brought out of storage for use when bad weather threatens to drag the smaller one.

Which of these items don't you have on board? One of the most often forgotten (until it's needed) is the anchor. Select the one most suited to your needs and have plenty of stout line to go with it.

You're likely to see a sign similar to this next time you visit a Wildlife Commission boating access area. You will have a safer trip if you heed it.

BOATING SAFETY CHECK LIST

- ✓ 1. Is there a Coast Guard approved lifesaving device for everyone aboard?
- ✓ 2. Do you have sufficient fuel?
- ✓ 3. Did you check the weather forecast?
- ✓ 4. Is there an anchor, paddle, and fire extinguisher aboard in case of trouble or an emergency?
- ✓ 5. Does someone know where you are going and when you will return?

PLEASE Obey the law and be courteous and careful at all times!

NORTH CAROLINA WILDLIFE RESOURCES COMMISSION DIVISION OF MOTORBOATS AND WATER SAFETY

Marked for Safety

by William A. Jansen

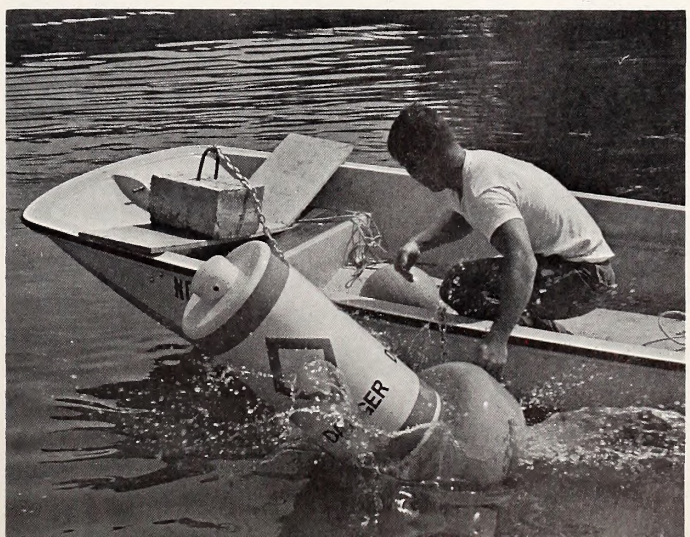
Danger spots were located on Gaston Reservoir, and the Motorboats and Water Safety Division's crew expertly marked them with the big orange and white buoys. When you see one, stay clear.

In its continuing program designed to make North Carolina's waterways safer, the Wildlife Commission has undertaken a pilot project of marking the State's major lakes with "danger" buoys. On May 1 of this year, personnel of the Wildlife Commission's Division of Motorboats and Water Safety, in cooperation with the Lake Gaston Water Safety Committee, installed 26 orange and white buoys on Lake Gaston. These rugged, 5-foot-high markers display the uniform waterway marker system diamond and the word "danger" to warn boatmen of a serious water hazard.

They were placed at sand bars, shallow areas, stumps and submerged objects throughout the Lake —sites determined by representatives of the Lake Gaston Water Safety Committee. It was pointed out that perhaps other hazardous situations exist on the Lake which were impractical to mark, and boatmen should maintain a watch for these also.

Personnel of the Motorboats and Water Safety Division did the placement of the buoys, which were anchored securely with heavy chain and concrete blocks. Wildlife Protector Wayne Wicker assisted with the project which was coordinated by Mr. Lloyd Andrews of Roanoke Rapids, representing the Lake Gaston Water Safety Committee.

Additional waters over the State are under study for similar buoy placement. Boaters are advised to watch for these danger areas at all times.



To Bug a Bear

by 1/Lt. Fred Alexander
Camp Lejeune, N. C.
Marine Corps Photos

"DON'T you think we'd better move back some?"

"Well, no. How would you feel if somebody lured you into a cage and after they'd kept you there a few days they jabbed you with a needle that put you to sleep. Then they punched holes in your ears, pried open your mouth to pull two good teeth, and strapped your arms and legs together, and hung you up on a tree limb. And finally when you still couldn't move they sat around talking about you as if you weren't there and laughed at jokes you couldn't understand. Would you want to stay around them anymore than you had to?"

After 4½ hours the effect of the tranquilizer wore off the she-bear, and unsteadily she reentered her forest home. The bear paused to steady herself and look back at the men two or three times, but as suggested, she had no interest in getting any closer.

First Lt. Bill Rogers, Assistant Director of the Natural Resources and Environmental Affairs Division at Camp Lejeune, is in charge of the bear survey being conducted at the Marine base. Rogers, who has a degree in wildlife management, explained, "The base is one of 28 North Carolina bear sanctuaries, and as requested by the N. C. Wildlife Resources Commission, we are cooperating with a black bear survey. Recent figures show that hunters are harvesting fewer black bears than in previous years, and this may mean the bear population is on the decline because of hunter overkill in years gone by.

"Here at Lejeune we will be tagging the bears we capture and using a radio transmitter collar to learn some of the bear's movements. The Wildlife Resources Commission will use the results of this study, which is also being conducted in Dare and Tyrrell Counties, in evaluating present regulations that pertain to the bear, and the effectiveness of the present sanctuaries set aside for it. The idea is to preserve this valuable game animal so that future generations can enjoy it, too."

According to Dave Hardy, "black bears are the only large mammal originally found in all the lower 48 states. They range naturally from the Arctic to Central Mexico, but man—its primary predator—has eliminated it from many areas."

Hardy, a graduate student in wildlife biology at Virginia Polytechnic Institute, is employed as a field biologist by the North Carolina State University zoology department. At the Marine base temporarily, because the first bear of the survey was caught there, his normal working area is in Dare

This 155 pound female bear triggered the Wildlife Commission's trap on the Camp Lejeune area and is transported to the work site by Lt. Bill Rogers (right) and Camp Lejeune ecologist, Julian Wooten. The radio transmitter collar is affixed to the tranquilized bear. Dave Hardy holds a portable tracking receiver.

and Tyrrell Counties' bear sanctuaries approximately 70 miles to the north.

"N. C. State is conducting the bear survey for the Wildlife Resources Commission using grants of federal and state funds. This survey is something of a trail-blazing work because so little is known about the black bear, especially this coastal variety," said Hardy.

The female bear captured at Lejeune was very aggressive, making defiant snorts, lunges, and snapping her teeth at the men safely on the other side of the cage. She is at least 7½ years old, weighs 155 lbs., and measures 4 ft. 10 in. from tip of her tail to her nose. Tracks analyzed by Julian Wooten, base ecologist, showed that she has two yearling cubs with her. The yearlings are able to fend for themselves, and probably were joined by the mother soon after she was released.

The bear was captured during the evening of April 25, using one of three trailer-mounted traps loaned by the State. The next day Rogers and Wooten moved the trap to a cool shaded location and brought plenty of food and water to her.

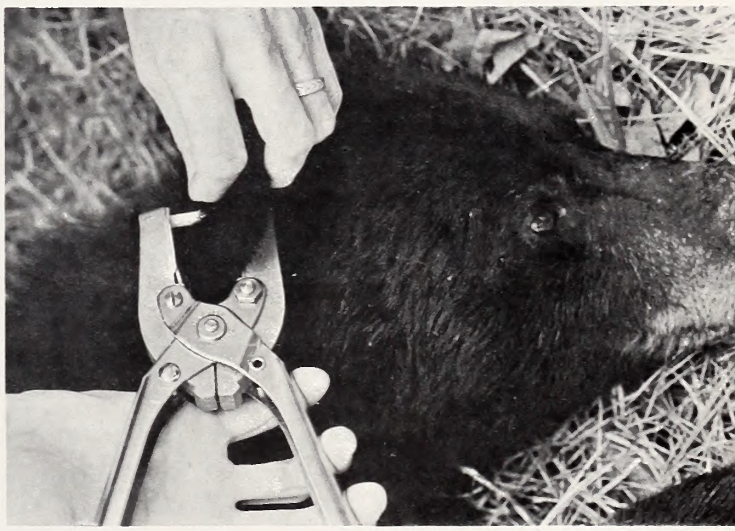
"Bears are creatures of habit, and since April 2, I had been feed-baiting 11 sites where bears or signs like tracks or rotten logs torn apart by bears looking for insects had been seen," said Rogers. "In areas where these signs recurred after our baiting I placed three traps, two from the State, and one made by the Base welding shop. That was in mid-April. We baited the traps with road-killed deer, fish-based catfood, and lunchmeat from a mess hall.

"To make the trap, which is a rectangular cage 4 ft. by 9 ft. mounted on a small trailer, look more natural to the bear, we placed pine needles in the floor and boughs on the top. I spread the strong smelling juice from our catfood on nearby vegetation to attract the bear. And, finally, we smoothed over the sand near the traps so animal tracks would show up better.

"Several days prior to the capture, Wooten and I noticed tracks near this particular trap. Apparently, the bear figured the hindquarter of deer and catfood in the trap were worth a closer inspection. To get the food the bear had to pull it from a latch that sprung the trap, causing the heavy metal at the front to fall into place," he continued.

Friday, April 27th, was the big day. At 12:30 p.m. Dr. William H. Pryor, Chief of the Veterinary Division of the Naval Medical Field Research Laboratory at Camp Lejeune, injected a special tranquilizer into the bear's rump using a three-foot syringe, while Wooten distracted it. The bear was immobilized in 15 minutes.

"The dosage was based on an estimate of the animal's weight. It's a very safe drug with a wide safety margin and no after-effects," said Dr. Pryor. He is an Air Force lieutenant colonel, as well as a veterinarian, and has worked "briefly with bears" on an Air Force project. The three-foot syringe he



A small pre-molar is extracted from the tranquilized bear for use in age determination (top). A 2-inch bright yellow tag is placed in each ear of the sleeping bruin by Lt. Rogers. After devoting a couple of days to science, the revived bear, complete with ear tags, heads for home. Now tracking will start.

used was a special creation of the NMFR Lab Equipment Testing and Development Division using a 30 inch plastic dowel to replace the normal plunger.

When it was apparent the bear was completely out, the trailer-mounted trap was upended and the bear gently dumped out. Dr. Pryor observed the animal closely, making certain the head was in a downward sloping position so saliva would run out, rather than back up in its lungs.

Rogers removed the two-inch, bright yellow tags labeled "1 USMC" and "2 USMC" from his pocket. He fitted the first of the two-part tags into a plier-like device. He pierced and attached the first to the left ear in a single motion, then he did the right one.

Rogers explained, sighting of a tagged bear means we've seen one we won't count twice in the survey, and if a number can be read, we can tell something about its movements from the time of tagging. Also, if the age is determined at the time of tagging, we will know the age of the bear anytime in the future, too."

The dental work for the aging study came next. Dr. Pryor inserted a stainless steel device called a speculum to hold the jaws apart. Using dental tools, he pushed back the gum surrounding the first tooth to be removed, and Hardy used pliers to remove it painlessly. It was his first experience in bear dentistry.

As Hardy described, "The tooth we pulled is a small pre-molar with a very shallow root. It's about the size of a human baby tooth and won't impair the masticating or defensive abilties of the animal.

"We pulled the tooth to determine its age. Each year a layer of cementum, the outside of a tooth below the gum line, is formed. The NMFR Lab here will use a special instrument called a microtome to make a slice less than a thousandth of an inch thick. When this tiny slice is stained and then viewed with a microscope, the age can be determined by counting the cementum layers."

Weighing the bear was the next step. Its limbs were bound with a wide leather harness and pulled together to center around a large metal "O" ring. The ring was placed on a pulley hooked on a heavy duty spring scale suspended from a nearby tree. Someone announced "The Great Bear Weight Guessing Contest," and guesses ranged from 145 to 175 lbs. It weighed 155 lbs., showing it a little on the large side of coastal bear average of 150 lbs.

Beginning the most extensive use of telemetry (radio tracking) in North Carolina, Hardy and Rogers attached the one pound plastic and Teflon collar. The bolt-on collar contained two small radio transmitters and batteries to power them continuously for a year. An omnidirectional broadcast antenna, about 10 inches long and 1/4 inch in diameter, protruded from the left side of the collar. Hardy brought two hand-held tracking antennas and two 30-foot antennas that can be linked to small receivers that indicate the proximity of the transmitterized bear. The receivers emit a beep and display a needle gauge that vacillates when the bear is in range. The range can vary from 1/4 to 8 miles depending upon weather conditions, vegetation density and the type of terrain.

Describing the employment of the equipment, Hardy said, "By using two receivers and a map we can find the exact location of the bear. The system is called triangulation and all you do is draw a straight line from the locations of the two receivers to the direction of the bear. The point where the lines meet is the location of the bear. We'll use this method and a tranquilizer rifle for recovering the transmitter collar.

"The big advantage of this system over any other is that it gives the exact location of the bear, enabling us to trace its daily movements, learn its feeding habits on a daily, seasonal, and annual basis.

"Let me illustrate how this works. Say we can tell the bear has been in a three-acre area for a number of days. When it leaves we can enter the area to see what it has eaten, and generally what kind of forest types and the degree of remoteness involved. Done enough times, we can expect to learn fairly accurately what areas the black bear is likely to inhabit. Then, we'll have some hard facts with which to evaluate our present sanctuaries."

By 1:30 p.m. the collar was on and the bear's measurements had been recorded. All that remained was the wait until the effects of the drug wore off so that she could take care of herself. Hardy and Rogers drove off in a pickup to learn the range of the collar transmitter under the present conditions. Dr. Pryor produced a small jar labeled "70% alcohol" into which he dropped wood ticks pulled from the bear. He was removing the ticks, some the size of a jelly bean, to make her more comfortable and to contribute to a NMFR Lab base entomology study.

During the next few hours the bear gradually regained movement. First her eyes and paws twitched at the click of a camera shutter or the clap of a hand. Next the tongue began to move, and then the head. By 4 p.m. she could pull herself a short distance using her forepaws. Within the hour the still dazed-looking bear staggered to all fours and walked a dozen feet, then fell over. By the time she was up after the third such try, Rogers detected a conscious personality behind the two small eyes.

More to himself than anyone else, he said quietly, "I don't like that look. No sir, I don't like that look at all. I've seen it before. When she was in the cage huffing and glaring at us.

Those pre-tranquilizer huffs and glares had come just before a cage-rattling lunge with bared teeth and outstretched claws.

But this time it was different. She just glared a while longer, turned her back on the men, and walked slowly, and a little unsteadily, into the darkening forest. ◆

A Look At North Carolina's Endangered Wildlife

Part 2

by Dr. Rowland Shelley
Raleigh

PHOTO BY REX GARY SCHMIDT

This month, birds are listed which carry the label "rare or endangered". Many are in serious trouble while others are simply on the edge of their range in our State.

Photo by Jack Dermid

Species	Range In N.C.	Preferred Habitat	General Comments	Status
Pelecanus occidentalis Brown Pelican	Uncommon local resident along coast	Coastal fringe, sounds & inlets. Nests on low islands	Nests only in Ocracoke inlet. Production, 1972, about 40 young.	Endangered
Haliaeetus leucocephalus Bald Eagle	Rare local resident along coast. Rare visitor elsewhere	Shores of sounds & large lakes.	Last known nesting site in N.C. is now unproductive.	Endangered
Falco peregrinus Peregrine Falcon	Uncommon to rare winter visitor along coast	Coast, mtns., & woodlands. Nests on cliffs.	East U.S. breeding population nearly extirpated.	Endangered

PHOTO BY JOEL ARRINGTON

Many bird species on this list are indicators of possible environmental problems that reach beyond the birds themselves. If they go, are others to follow? What of man himself, if the habitat is unfit for wildlife?

Species	Range In N.C.	Preferred Habitat	General Comments	Status
Sterna albifrons Least tern	Common-Uncommon summer resident	Coastal fringe. Nests on beaches or low sandy islands.	Major decline in numbers noted. Low nesting sites of this sp. very vulnerable to tides and storms.	Endangered
Dendrocopus borealis Red-cockaded* woodpecker	Uncommon-rare local resident coastal plain & extreme eastern piedmont.	Requires extensive pine forest containing trees infected by fungus, **Fomes pini.**	Habitat requirements not met in forests managed for timber or pulpwood production.	Endangered
Aquila chrysaetos Golden Eagle	Occasional visitor in mtns.	Open country, mtns.	Small N.E. Appalachian population declined greatly.	Rare
Coturnicops noveboracensis Yellow Rail	Uncommon-rare winter resident along coast.	Marshes & grassy fields.	Abundance & distribution in N.C. poorly known. Habitat loss is threat.	Rare
Laterallus jamaicensis Black Rail	Uncommon-rare summer resident on coast & perhaps inland.	Marshes, wet grassy fields.	As above.	Rare
Gelochelidon nilotica Gull-billed Tern	Rare summer resident along coast.	Coastal fringe Nests on beaches or low sandy islands	Principally use dredge islands for nesting.	Rare
Passerculus princeps Ipswich Sparrow	Uncommon-Rare winter resident along outer banks.	Found in beach grasses on sand dunes.	Outer Banks may become major wintering area due to habitat loss elsewhere.	Rare
Cathartes aura Turkey Vulture	Common-uncom. resident statewide.	Fields & woodlands.	May be declining due to changes in land use & agricultural practices	Undetermined

*Nesting pairs near Neuse R. threatened by Falls of Neuse Dam.

Species	Range In N.C.	Preferred Habitat	General Comments	Status
Coragyps atratus Black Vulture	Common-uncommon resident pied. & coastal plain.	Fields & woodlands.	May be declining due to changes in land use & agricultural practices.	Undetermined
Accipiter striatus Sharp-shinned Hawk	Uncommon summer resident, Piedmont and mtns. Winter resident statewide.	Open woodlands & wood margins.	General decline in N.C., drastic decline recently in N.E. states.	Undetermined
Accipiter cooperii Cooper's Hawk	Uncommon resident statewide.	As above.	As Above	Undetermined
Buteo lineatus Red-shouldered Hawk	Uncommon resident east of mountains.	Moist woodlands, especially near rivers & swamps.	Recent study showed decline in N.C. of 70% since 1950.	Undetermined
Pandion haliaetus Osprey	Uncommon summer resident along coast. Transient elsewhere.	Large lakes, rivers & sounds	N.C. popn. relatively stable, but populations to north are threatened.	Undetermined
Thalasseus maximus Royal Tern	Fairly common summer resident.	Coastal fringe, Nests on beaches or low sandy islands.	Terns increasingly use dredge islands for nesting.	Undetermined
Melanerpes erythrocephalus Red-headed Woodpecker	Uncommon resident statewide	Open deciduous woods, open wooded areas on farms & in towns.	Competition with Starlings & loss habitat caused species to decline.	Undetermined
Sialia sialis Eastern Bluebird	Common-uncommon resident state-wide	Orchards, farms, & field edges.	Lack of suitable nesting sites and competition with House Sparrows & Starlings are threatening factors.	Undetermined
Limnothlypis swainsonii Swainson's Warbler	Locally uncom-rare summer resident coastal plain & mountains.	Swamps & river floodplains in coastal plain & Rhododendron thickets in mtns.	Habitat loss may threaten coastal plain popn. Distribution in mtns. poorly known.	Undetermined
Aimophila aestivalis Bachman's Sparrow	Uncommon-rare summer resident & local permanent resident coastal plain.	Usually in open longleaf pine forest with wiregrass understory	Found easily only in southeastern coastal plain.	Undetermined
Charadrius melodus Piping Plover	Locally uncom.-rare summer resident on coast.	Dry sandy beaches	Pressure on nesting habitat from increasing recreational use of beaches.	Peripheral-Rare breeder in N.C.
Sterno hirundo Common Tern	Uncommon-rare breeding summer resident.	Coastal fringe. Nests on beaches or low sandy islands.	Terns increasingly use dredge islands for nesting.	Peripheral-Rare breeder in N.C.
Thalasseus sandvicensis Sandwich Tern	Uncommon summer resident.	As Above.	As Above.	Peripheral-Undetermined in N.C.
Aegolius acadicus Saw-whet Owl	Uncom. local summer resident of higher moutains.	At spruce-fir/ northern hardwood transition zone.	N.C. southern limit range.	Peripheral-Rare in N.C.
Nuttallornis borealis Olive-sided Flycatcher	Uncom.-rare local summer resident high mountains.	Open situations in spruce-fir forests.	N.C. southern limit range.	Peripheral-Rare in N.C.
Corvus corvax Common Raven	Uncommon-rare resident higher mtns.	Forests & balds of high mtns.	Mtns. of N.C. near southern limit range.	Peripheral-Rare in N.C.
Parus atricapillus Black-Capped Chickadee	Uncom.-resident higher mountains.	Breeds in spruce-fir forests.	N.C. southern limit range.	Peripheral-Undetermined in N.C.
Loxia curvirostra Red Crossbill	Rare summer resident & fairly common winter resident high mtns.	Spruce-fir forests of high mountains.	N.C. southern limit range.	Peripheral-Rare breeder in N.C.

Rationing the Backcountry

by Peter Dunning
Harpers Ferry, West Virginia

IT is an irony typical of our time that the Appalachian Trail, designed 50 years ago as a footpath through the wilderness, should today be threatened in parts by overuse and overcrowding. Of course much of the trail is isolated from this, but in certain areas where the AT is easily accessible and well known, people must take to the wilderness elbow to elbow, as it were.

The Appalachian Trail passes through two of the most popular recreational areas in the country, the Shenandoah National Park in Virginia and the Great Smoky Mountains National Park here in Tennessee and North Carolina. Last year, the Great Smoky Mountains National Park instituted a system designed to limit overnight backcountry use within the park. The system was part of an overall National Park Service program to explore methods of dealing with problems of overuse and overcrowding of backcountry areas.

In an attempt to find out more about the system, I contacted Mr. Vincent Ellis, Superintendent, Great Smoky Mountains National Park, Gatlinburg, Tennessee. My questions and his answers follow.

Why is a system that rations backcountry overnight use necessary?

"There are some trail areas where a marked deterioration of natural resources has been taking place and where sanitation facilities have been extremely overtaxed because too many hikers have occupied the same area for too long."

What is the purpose of rationing?

"One of the primary goals of scheduling backcountry use is to introduce hikers to the less-crowded trails and thereby enhance their enjoyment of the park. We would prefer not to view the rationing as a set of restrictions but instead as a cooperative effort by the park and hiker to save our natural resources by keeping use in these few extremely popular overcrowded areas at a more optimum level."

How does the system work?

"For some time, a camping permit has been required in order to stay *overnight at any backcountry area* within the Great Smoky Mountains National Park. This permit is issued without charge at any ranger station, visitor center, or at park headquarters upon arrival at the park. The system we have introduced sets aside certain popular backcountry areas and then limits the number of overnight hikers that may be permitted in each of these areas during one 24-hour period."

What areas are now rationed?

"As of June, 1972, the areas of limited use are the entire Appalachian Trail within the Great Smokies, and four scattered but extremely popular shelter areas, Mount LeConte, Kephart, Laurel Gap and Moore Spring."

How did you decide the overnight camping capacity within these particular areas?

"It was fairly simple. The overnight use of these areas was limited to the design capacity of each shelter within the area. Thus the number of overnight hikers permitted on the Appalachian Trail and other rationed areas is limited to the number of available bunks." (Note: By the author's count, there are 14 trail shelters on the AT in the park with a total of 172 bunks.)

Would someone who just wanted to take an afternoon's walk on the AT need a permit?

"No. This program does not affect day-only hikers or normal visitor use of the developed areas within the park."

Can these overnight camping permits for backcountry use be obtained in advance?

"Not for the rationed areas. Camping permits for these sites may be obtained in person at the park *no more than 24 hours in advance of departure on the trail.* We suggest that those people who are planning in advance to use sites within rationed areas should also plan an alternate route to be used in the event there are no vacancies in the limited areas. Listings of trailside campsites are available upon request for advance planning.

"We do make special exception for hikers involved in long distance hikes that start outside the park. We should be able to continue to honor advance requests from these hikers as long as the number of such requests remains low. Incidentally, in these special cases we are not able to guarantee shelter space for the hiker, but this hasn't proved much problem as long distance hikers generally carry their own lightweight shelter gear.

"We continue to issue permits in advance for sites not included in the limited areas or subject to winter camping restrictions."

How many backcountry camping permits were issued last year?

"We have not tallied the number of permits issued during the past year. Overnight visits in the park's backcountry, however, have been estimated at 67,660 through December, 1972. This does not represent the number of permits issued; only camper nights."

How does the park enforce its permit system?

"Rangers may issue citations for violations of any of the Rules and Regulations governing park use. A number of citations for camping without permits, or for camping in undesignated locations have been issued. Minimum fine is $25.00, but may be higher depending upon circumstances of individual offenses."

Is there a limit to the size of a group that may use the rationed areas in the park?

"Most shelters accommodate 12 or 14 persons. Therefore, groups of 25 persons would not be permitted to use a shelter. The smaller a group is, the better chances are for obtaining space at a particular shelter."

Was your rationing system successful last year?

"The trail scheduling system was quite successful in holding use at the shelters within the limits of their design capacity. Trail maintenance crews report that the maintenance workload was reduced by as much as 70 percent at some shelter locations. A greater workload was noticed at other areas, however, as the programs distributed overnight trail use to uncrowded areas.

"The primary problem encountered was the difficulty of re-routing some of the large groups because of long-range pre-planning and transportation arrangements they had made. We are aware of the special needs of organized hiking groups, such as the Boy Scouts, and every consideration will be given these groups so that they will not have to curtail traditional summer outings to the park, although they may not be able to use areas in the rationed zones.

"We feel that the few problems encountered will be alleviated as more people become aware of the program."

Overuse and overcrowding of our hiking trails will continue to be the price of the increasing popularity of camping and backpacking. This is going to affect all areas of the Appalachian Trail, not just the well-known areas of the Smokies and the Shenandoah.

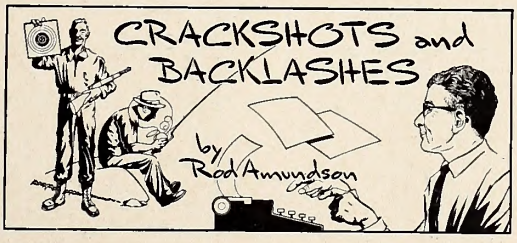
The system of rationing overnight backcountry use as "a cooperative effort by the park and hiker to save our natural resources" is one approach to dealing with the problem. As long as the focus remains on introducing hikers to the less-crowded trail areas in the park and not merely restricting the use of traditionally over-crowded areas, this approach should be productive.

But this speaks for one small area: 64 miles of a total 2,000 mile Appalachian Trail, not to mention other trails and other backcountry areas. There is a need to accommodate the growing popularity of the outdoor hiking experience and particularly the backcountry experience.

Where this concerns hiking on the Appalachian Trail, perhaps we should examine the potentials of building more trails (as provided in the National Trail System Act of 1968), of designing the existing trails to accommodate greater use, and of making information available that would encourage hiker use of the less known, under-used sections of existing trails.

Finally, perhaps an effort should be made to help people who want to use the trails understand the necessary fundamentals of safe (and non-destructive) hiking and camping. Much of the emphasis today is on equipment, on what a person needs to buy to take to the trail. This misses the essential point about using the outdoors: it generally arises from a desire basic in us all to be on the land.

Any discussion of the fundamentals of camping and hiking, of living however temporarily on the land, must begin with a commitment and a respect of the land. And then all subsequent discussions of where-to and how-to have solid foundation in what the whole outdoor experience is truly about. ⬍⬍



THE ROGUE HUNTER

According to Warren Page, President of the National Shooting Sports Foundation, "It is time legitimate sportsmen really did something about the rogue hunter, the poacher, and his brother the game hog. We must show the public that those who violate either the written or the unwritten laws of our sport are truly rogues, worthless and dishonest individuals who are unwelcome in the fellowship of ethical sportsmen."

Page states, "It is not enough for us to refuse to associate with the rogue hunter; we need to help make him answer for his actions. The answer to this problem is cooperation with Conservation Department enforcement authorities. Every sportsman is obliged to report game law violations immediately. And as for the old line about 'not wanting to get involved,' forget it. The rogue hunter is nothing more than a particularly vicious kind of thief. He steals from the honest hunter by abusing the wildlife heritage that sportsmen have worked for and spent billions of dollars to preserve."

New Books of Interest to the Sportsman

Of particular interest to the North Carolina outdoorsman are two new books published by the J. B. Lippincott Co.: "The World of the Gray Squirrel" by Dr. Fred S. Barkalow, Jr., and Monica Shorten; and "The World of the Wood Duck" by Dr. F. Eugene Hester and Jack Dermid.

The names of Barkalow, Hester and Dermid certainly are familiar to Tar Heel conservationists. Dr. Barkalow is presently Professor of Zoology and Forestry at N. C. State University and has long been active in conservation circles on state and national levels. The co-author of the volume on the gray squirrel, Monica Shorten is a British mammalogist and researcher. The team has done a remarkable job of blending meticulous scientific findings with a personal warmth, thus bringing the reader an interesting, factual, per-

KNOW YOUR PROTECTOR

Lawrence Gary Norman

Wildlife protector Lawrence Gary Norman, stationed at Pollocksville in Jones County was born October 26, 1938, in Carteret County. He is the son of Mr. and Mrs. Mark Norman of Oriental, North Carolina. Gary is a graduate of Pamlico County High School.

Prior to employment with the North Carolina Wildlife Resources Commission, he served seven years in the United States Coast Guard.

Gary completed the basic school for wildlife protectors at the Institute of Government at Chapel Hill, North Carolina, in July of 1966. He was employed as a wildlife protector trainee in March of 1967 and stationed at New Bern, North Carolina. In October of 1967 he was appointed wildlife protector and stationed in Wake County. In 1968 he was transferred to Jones County. Since his initial employment, he has attended five In-Service Training Schools.

Mr. Norman is a member of the Southeastern Association of Game and Fish Commissioners, Law Enforcement Section; State Employee's Association; and North Carolina Association of Wildlife Law Enforcement Officers. He is actively engaged in work with the Boy Scouts of America, presently serving as Cub Master of Pack 503.

Gary is married to the former Betty Betts of Elizabeth City, North Carolina, and they have four sons, Stephen, age 10; Brentley, age 7; Ashley, age 3; and Joseph, age 8 months. The Norman family are active in the Church of Jesus Christ of Latter Day Saints in New Bern. Mr. Norman holds the office of Seventy in the Melchizedek Priesthood.

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sonally satisfying account of one of our best known wildlife neighbors and our State Mammal.

The book is illustrated with dozens of top-notch photos which certainly must be one of the best collections of squirrel portraits ever assembled. The volume is available from the J. B. Lippincott Co., Philadelphia and New York, at $5.95.

Gene Hester is currently Chief of the Division of Fishery Research of the Bureau of Sport Fisheries and Wildlife in Washington, D. C. But he is best known by his fellow Tar Heels for his work on the family ponds near Wendell where he made a life-long study of the wood duck.

Jack Dermid is certainly one of the best of Wildlife photographers, and the fine illustrations in the book are truly outstanding. Jack spent many years with the Wildlife Resources Commission building its collection of photos and motion picture footage that is rated as one of the finest in the U.S.

"The World of the Wood Duck" exhibits the unique set of qualities that its authors possess: true love for their subject, infinite patience and insistence on detail, plus a presentation of the personality of the wood duck. This book carries on the tradition of high quality of this "Living World" series. It is available from the Lippincott Co. for $5.95.

APPALACHIAN TRAIL

• **continued from page 12**

Bald (5,516 ft.) From its summit, you could see back to the Smokies looming in the southwest where you'd just been . . . and you could see forward to famous Roan Mountain and beyond where you would be in a week. And all around you, an ocean of ancient mountain summits and the feeling of centuries suspended in the land.

Halfway between Big Bald and the Roan the trail crosses a river whose name has stuck in my mind ever since: the Nolichucky River. I don't know how or when or why this river got its wonderful name; I'm sure there is a practical explanation. Nevertheless, I think it's a marvelous name and I intend to name my next dog Nolichucky.

Honesty forces me to confess that the fabled magnificence of Roan Mountain was lost on me . . . or more accurately, I was lost on it. It was a foggy wet day when I began my climb of that long steep south slope. By the time I reached the top, it was raining hard and a heavy fog cut the visibility to ten feet. I was lost for two hours, soaked to the skin, cold, and pretty angry by the time I finally got down.

I'm told that there are beautiful natural rhododendron gardens and unparalleled views from the Roan . . . that may well be.

I spent two days, two glorious sun-shiny days in the Laurel Fork Gorge, the next surprise along the trail. This place was one of the highlights of my entire walk. The guidebook says this of the Laurel Fork Gorge: "With its sheer cliffs and wooded slopes, its rhododendron and mountain laurel, waterfalls and rapids, its ever changing direction and appearance, the gorge possesses a degree of spectacular natural beauty perhaps unsurpassed along the entire Appalachian Trail." (Page 63; *Guide To The Appalachian Trail In Tennessee and North Carolina,* Appalachian Trail Conference, Harpers Ferry, West Virginia.)

By now the trail had turned north, away from the Tennessee-North Carolina border it had followed since the Smokies, and into Tennessee. It was 45 miles and three days before I made the Virginia state line and the little town of Damascus (Va.), my third scheduled supply stop.

Along this section, about 15-20 miles beyond Laurel Fork, and somewhere in the Iron Mountain-Holston Mountain area, there is

a small overgrown clearing with a single grave site and a monument. It is just off the trail, to the left heading north on the trail as I remember.

Just a grave site out in the forest. But the monument is a fine, city-looking one, five feet tall of polished stone. If you walk over to the monument, you'll find an inscription on the other side which reads:

"Uncle Nick Grindstaff
—born Dec. 26, 1851—
—died July 22, 1922—
lived alone, suffered alone, and died alone."

If you're on the trail in Tennessee near the Iron Mountain-Holston Mountain area, be on the lookout for this monument. Or better still, if you're in the vicinity of Damascus, Virginia, step into the post office and ask the postmaster about that gravesite down on the Appalachian Trail. Maybe he can tell you the story behind it. Incidentally, the postmaster's name is Grindstaff. ⬍⬍

GEESE continued from page 9

indications from the kill data that in the past the Mattamuskeet flock was often over-harvested. It is unreasonable to assume the flock can ever sustain such harvest rates again. We suggest, therefore, a new management approach to perpetuate the Mattamuskeet goose flock. In preparing such a management plan the following should be carefully considered:

1. The possible effects of short stopping and differential bag limits on the Mattamuskeet goose flock are the concern of several states. Hence, such problems should be brought before the Canada Goose Committee of the Atlantic Waterfowl Council in order that any conflicts may be resolved as part of the Council's coordinated flyway management plan.

2. Reduction of hunter harvest: It has been recommended by several biologists that Mattamuskeet Lake be closed to goose hunting until the goose population reaches at least 30,000. In the rest of Hyde County, it may be advisable to reduce the season length while holding the daily bag limit at one bird.

3. Reduction of hunting pressure. Consideration should be given to the acquisition or leasing of several thousand acres of private farm land immediately adjacent to the refuge. This area would serve as a refuge where corn and other crops are grown and made available for waterfowl.

4. Decoy flocks: Thought should be given toward developing decoy flocks to induce Canada geese to use refuge areas and further reduce harvest and harrassment.

5. Managed harvest: Most Mattamuskeet farms are too small for effectively creating a managed hunt plan and most landowners have not been able to individually create such a program. Some sort of cooperative block or unit harvest program should be considered so that aggregate acreages can be closed and opened for a few days at a time. Usually no more than three days hunting is allowed in any week with this type of management.

6. There is no guarantee that if any or all these various proposals were undertaken the goose flock at Mattamuskeet can be saved. However, it is also quite certain that without some coordinated state-federal management plan in the very near future there is no hope for the Canada goose at Mattamuskeet at all. ⬍⬍

Table 1 Midwinter Canada Goose Populations Atlantic Flyway, 1953-1972

Year	Atlantic Flyway	Percent Change	Percentage of Population in				
			Delmarva*	North of** Delmarva	South of*** Delmarva	N. C.	Mattamuskeet
1953	488,258	....	55.5	2.8	41.7	31.0	13.6
1954	339,000	−30.6	55.6	3.7	40.7	31.8	12.7
1960	370,000	+ 9.4	49.7	2.1	48.2	40.0	19.7
1961	538,800	+45.3	58.4	2.0	39.6	35.1	15.8
1962	415,900	−22.8	59.1	4.2	36.8	30.1	16.0
1963	477,400	+14.8	57.2	2.9	39.9	31.3	10.6
1964	528,200	+10.6	56.0	4.0	40.1	30.7	10.4
1965	482,500	− 8.7	68.5	3.8	27.7	20.6	6.1
1966	600,200	+24.4	75.4	3.4	21.3	15.2	5.2
1967	604,000	+ 0.6	79.5	4.2	16.2	10.9	5.1
1968	615,200	+ 1.9	81.4	3.6	15.0	11.6	3.9
1969	678,800	+10.3	79.8	3.9	16.2	13.6	3.6
1970	775,200	+14.2	85.3	3.2	11.4	9.2	2.3
1971	675,000	−12.9	81.9	5.2	12.9	11.4	3.2
1972	700,200	+ 3.7	81.9	11.5	6.6	5.2	1.8
15-Yr. Average	552,637	+ 4.3	68.3	4.0	27.6	21.8	8.7

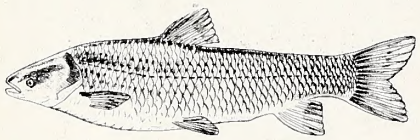
* Includes Delaware, Maryland, New Jersey and Virginia

** Includes Maine, New Hampshire, Vermont, Massachusetts, Connecticut, Rhode Island, New York and Pennsylvania

*** Includes North Carolina, South Carolina, Georgia and Florida

UNWANTED

Dead or Alive in North Carolina



Scientific Name:

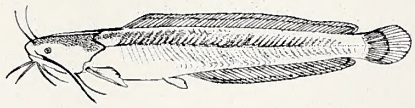
Ctenopharyngodon idella

Alias:

Gross Carp, White Amur

Description: Elongate body, greenish brawn on top dissalving into silver on the sides and battom; mouth subterminal; dorsal fin with 3 spines and 7 rays; anal fin with 3 spines and 8 rays; gill rakers shart, wide-spaced, about 12 in number; length up to 1 meter ond over; weight up to 32 kg. No barbels or whiskers.

"Wanted" in Arkansas for aggrovoted assault on aquatic vegetation. Has been declared an autlow in Missouri, Colifarnia and Texos. Is reported to viciously attack defenseless freshwoter shrimp. Patential danger to many oquatic plants that serve as duck faod.



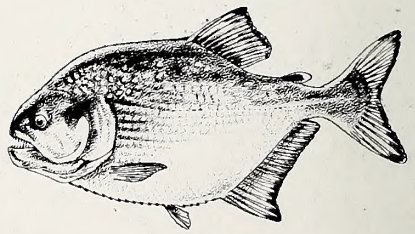
Clarias sp.

Alias:

Wolking Cotfish

Elongate, sometimes eel-shoped cotfishes; brood, flat head; 4 pairs of borbels; teeth smoll; skin scaleless; accessory air-breothing organs; olbinism frequent.

Numerous outlaw bands exist in Florido which reportedly attack existing populotions of native American gamefishes. Very hordy and vorocious. Reported to leave the woter for excursions in search af food. (Rumored to enjoy chasing one of our most treasured American species — the dog!)



Characins of the genera Serrasalmus, Rooseveltiella and Pygocentrus

Alias:

Pironho

Powerful ond shorp dentition; body deep, strongly compressed; keel on belly; lorge eyes; colorotion voriable; odipose fin present.

Hos been on outlaw for centuries in South America; wonted for murder ond oggrovoted ossoult on man and other assorted animols. Trovels in schools. Avidly sought by tropicol fish fonciers.

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Wildlife IN NORTH CAROLINA

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PHOTO BY REX GARY SCHMIDT

Summer Stream

Many small streams over the State offer good fishing and plenty of solitude for the mid-summer angler. Investigate one near you.

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GOVERNOR

DEPARTMENT OF
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JAMES E. HARRINGTON, JR.
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WILDLIFE N NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 103,600

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 8 AUGUST, 1973

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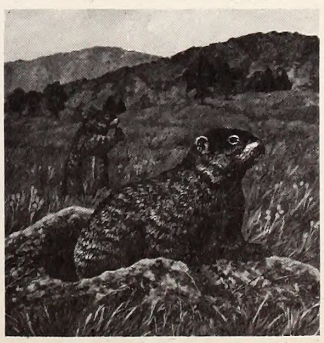
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



Although a summer's drive along the Blue Ridge Parkway is perhaps the best way to see a groundhog or woodchuck, you can expect to discover one just about anywhere in the northern tier of North Carolina counties as far east as Hertford. They seem to be spreading and extending their original range. They do offer some good hunting but may damage garden and farm crops when they become too numerous. Painting by Kent Pendleton.

Black River: Journey to the Ocean

Dwight L. Peterson
Maps by the Author

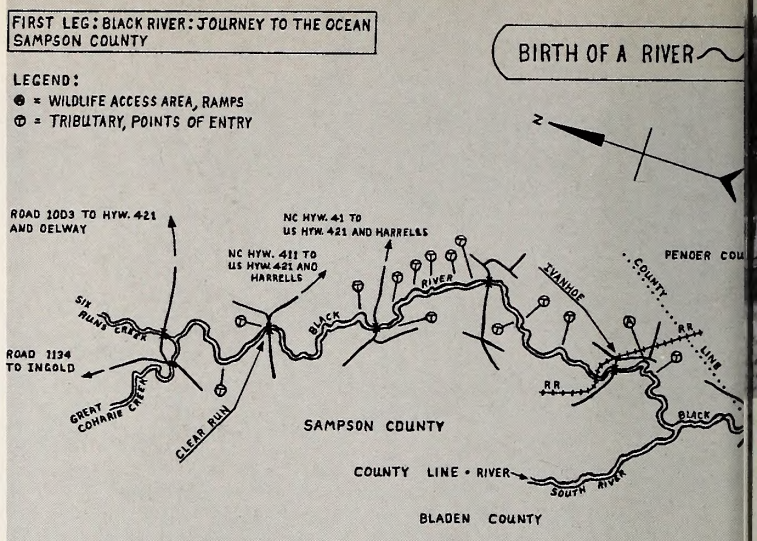
AT a point a few miles south of Ingold, in Sampson County, two streams meet and surrender their names. No mumuring death chant can be heard in their currents, for here they join force. Here, at this point, is not death but another beginning. Now, by marriage of nature, the two are one . . . Black River.

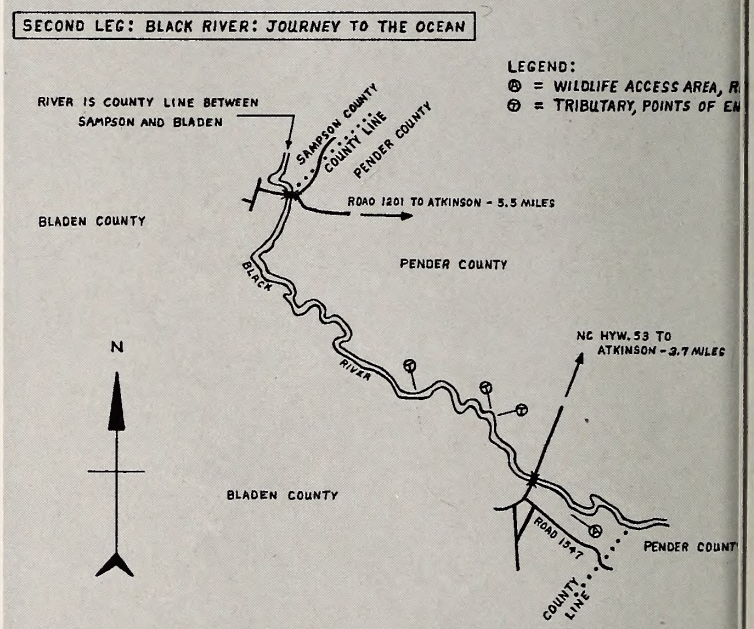
Sometimes solemn and tranquil, sometimes not, Black River moves its current beneath giant trees draped in ragged beards of Spanish moss. Beauty is a word used to describe many things, shall I say *naturally beautiful?* And I suppose this is a very appropriate all-round description of Black River. But, as the saying goes, "Beauty is in the eyes of the beholder." The naturalist would observe Black River with admiration and an eye for detail. Wild animals, birds, trees, insects, anything concerned with nature, and within the boundaries of this river, would fall on the eye of an attentive naturalist or nature lover. And there is plenty to see, believe me. As no two things are identically the same, so it is with Black River compared with other rivers in our state. It has its own unique beauty, its own individual character, its own matchless charm.

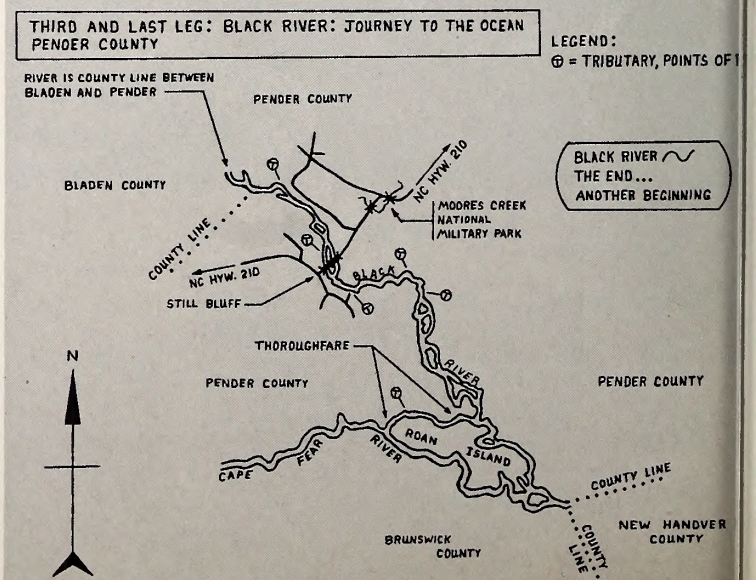
The forks, as local folks call it, is the beginning of Black River. So let's slip our boat down the banks, into the water, and take a drifting journey toward the ocean. There will be no need to strain at a paddle, just use it for navigation. Let the current do the work. Relax.

Coharie (spelled "Cohary" on early maps) and Six Runs Creeks, the mother streams of Black River, have much to be said for themselves. But Black River proudly shoulders their fame as excellent fishing waters and adds more fame to the family heritage. At the union of these two streams, the forks, Black River is fairly narrow compared to its size further downstream and into its tidal waters. But here, where name and fame begin, also is a mystery.

During the early spring months, American shad migrate up Black River, and upon reaching the forks, the shad choose only one of these two streams in which to continue their upstream spawning run. This stream is Six Runs. There has been an occasional exception, but shad up Coharie is a rare occurrence. I wrote Jimmy Davis, Regional Supervsior for the Division of Inland Fisheries, concerning the why of this mystery and question. His reply was as follows: "The shad up Coharie is a difficult question. The only difference in water quality is a low pH in Coharie (highly acid). Shad







PHOTOS BY DUANE RAVER

Fishing in the Black River can be very good and these picturesque waters are popular with float fishermen. Small outboards can be used with care where the river widens. The redbreast sunfish (below) is one of the prime targets of the angler.

do not live well in highly acid waters. Six Runs is near neutral pH (6.5)."

Eastern, or coastal, fresh water streams in North Carolina are fairly acid or near neutral. For this reason, many species of fish prefer these waters to the waters of the remaining part of the state. Of course, there are other factors involved, such as water temperature, how well-aerated the waters of a certain stream may be, and other components necessary for successful habitat of a certain species of fish. Comparing the trout with the pickerel would be an example. Trout prefer and require pure, cold, swift running (well-aerated) streams like those found in the western portion of our state. Pickerel, on the other land, inhabit the waters of the Atlantic Coastal Drainage section of which Black River is a member. Black River contains all necessary requirements for ideal pickerel habitat. A few of these requirements would be unpolluted, placid water, a near neutral or slightly acid pH value. A good description of Black River, in short, would be, "swamp-fed, *black* water of the Coastal Plain region."

I stress the word "black" in this short description because, actually, this word could be applied to most all our coastal streams. "Tea-colored" has often been used in describing our coastal waters. I can think of no better term to illustrate, or form a word picture for the mind's eye, than this short expression . . . tea-colored. This term more aptly depicts this water coloration than does "black." If you should peer down into this water where it is fairly deep, it does appear black. Conditions such as lack of light and possibly a dark bottom produce this effect. For this reason we can better comprehend the why in Black River's name. But when observing this water running across white sand or gravel, we know, then, why most people and many writers prefer the term tea-colored.

If you are wondering how this water obtains its color, let's examine some word definitions to help clarify this question. *Swamp*: spongy land; low ground filled with water; soft, wet ground; a marsh; a bog. *Peat:* partly decayed, moisture-absorbing plant matter found in ancient bogs and swamps. *Dye:* a color, tint, or hue produced by dyeing. A coloring matter used for dyeing. *Tannic Acid:* a substance derived from oak bark, or any of a number of similar substances, used in tanning, dyeing, medicine, etc.

By combining these dictionary definitions, and remembering that Black River and our other coastal streams are *swamp-fed,* we can better understand their coloration. Decaying, moisture-absorbing plant matter such as oak (also maple, alder, leaves of sumac and others) produce a dyeing effect in these waters. Thus, we arrive at a logical and simplified explanation of the descriptive terms, tea-colored or black. And, also, a fair explanation of acid content.

IN order to make our journey toward the ocean a little more knowledgeable, let's look at a resume of this river by William S. Powell. In his book, THE NORTH CAROLINA GAZETTEER (Chapel Hill, The University of North Carolina Press, 1968), he has this to say about the river. "Black River, formed in south Sampson County by the junction of Six Runs Creek and Coharie River. It flows south on the Bladen-Sampson County line, the Bladen-Pender County line, and into west Pender County where it turns southeast to flow into Cape Fear River at the New Havover County line. Approximately 30 miles long. Appears as Black or Swampy River on the Mosely map, 1733."

As we continue our journey, let's assume the river is at normal level and its character is serene and peaceful. It's spring, and the world is alive after a sleeping winter. Slowly, we move with the current. Soon the forks disappears as we round the first bend. The magic charm of the river willingly engrosses our spirits, and we are hurled from a nerve-tingling world of progress and rush into a world of natural wonder and splendor. Here, we are at peace. We are integrated with the very substance of our souls. Our minds become numb as this transition creeps through our bodies. We *see* and *notice* things we usually hurry past . . . maybe, with a glance, rushing to our jobs, we know it's there, but we never actually *see* it . . . a tree, a flower.

Now, drifting down Black River, we are under its spell. The mingling fragrance of evergreens, flowers and swamp—an otter swimming the river ahead of the boat—a wood duck hiding her young

under some drifting limbs lodged near the river bank—crows talking from the pine tops—a gray squirrel sitting, thinking unobserved, in the fork of a huge cypress with limbs enveloped in Spanish moss. This territory teems with wildlife, flora and fauna. This is our world . . . a gift from God . . . in which we belong . . . which we must protect . . . to survive.

To make our trip down Black River even more intriguing, maybe we should view some interesting elements associated with this river. Historical and other, the anatomy of a river, any river, covers a broad area of verbal expression. I can by no means cover it all here.

• Clear Run is the first bridge you pass downstream from the forks. A small stream enters Black River on the left just before you reach the bridge. This stream is called Clear Run. Clear Run was the head of Black River steamboat travel in the 1700's. On your right, on the river bank, just after you pass the bridge, you will find remains of rosin (resin) which was one of the forest products shipped down the river by these steamboats.

• The bridge as you approach Ivanhoe is called Corbett's Bridge. The army of Cornwallis, during the Revolution, crossed this bridge. This was at the time of the Battle of Moore's Creek.

• Ivanhoe, a very old town, was at one time an important trading center. (Lisbon, first settlement in Sampson County, important trading and shipping center, located about where the lumber mill is now at Ivanhoe, died with decline of river traffic, no remains.) Black River Presbyterian Church is located here, at Ivanhoe, the oldest in Sampson County, built about 1740. There is a Wildlife Commission boating access area here, off SS Road #1100.

• In 1746 Highland Scots came up the Cape Fear River from Wilmington and began settlements along South and Black Rivers. At that time, Black River was a very important means of river transportation.

• About three river miles downstream from the boating access area at Ivanhoe, Black River and South River unite. South River is another river very popular with fishermen and other sportsmen. At this point, South River willingly gives up its name and becomes a part of Black River, adding even more prestige to the name.

• About two river miles downstream from the bridge on N. C. Highway 53, and just off SS Road #1547 in Bladen County is the second and last boating access area on Black River, but there are many privately-owned landings located along the river that are used by the public.

• Tidal water begins in the vicinity between the access area at Ivanhoe and the access area below N. C. Highway 53.

• Well-known Moore's Creek National Military Park is located some two miles north, on N. C. Highway 210, from the bridge crossing Black River. A few miles downstream from the 210 bridge, Moore's Creek enters Black River. This is in Pender County, and well recognized by sportsmen.

• There are twenty-three map-noted tributaries entering Black River. This includes South River and the one combined tributary of Buckle Creek and Lyon Creek entering the Thoroughfare in the Roan Island section. At the mouth of these tributaries, fishing is excellent. Also, it would be well worth a fisherman's time to enter some of these tributaries and try the fishing.

• Black River is blessed with magnificent coves, most of which are in the tidal section. Don't pass these by while fishing. (And don't forget to enjoy the beauty.) Fishing is usually best in the tidal waters when tide water is from half out, to low, back to about half high. Fishing is seldom good during any time of flood water on any portion of Black River. Hunting and sportsmen's clubs are numerous along the course of Black River.

• If outboard motors are used in the upper portion of Black River, use small ones with care. Larger ones can be used upstream from N. C. Highway 53 on down to the junction of the Cape Fear River.

• Some of the game animals and birds along Black River are white-tailed deer, black bear, squirrel, rabbit, quail and turkey. Others (and so-called fur-bearers) are raccoon, opossum, fox, mink, otter and muskrat.

• Some of the more popular game fishes are largemouth bass, chain pickerel (jack), redfin pickerel, bluegill, redbreast (robin), yellow perch (raccoon perch), redear (shellcracker), black crappie, warmouth (open mouth), American shad and other members of the herring family during the spring spawning runs. Roughfish include gar, carp, catfish, bowfin (blackfish), eel and sucker. This is not a complete list of animals, birds and fishes. For example, many species of ducks use this territory during winter. Wood ducks are native.

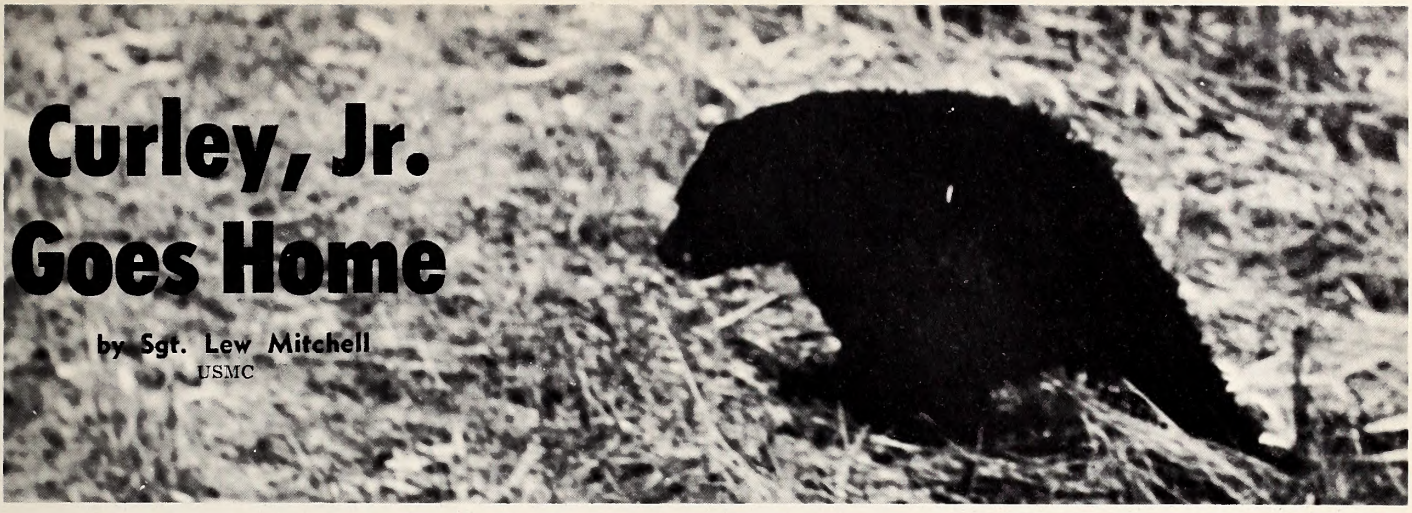
• The banks of Black River are surprisingly high in places, adding form and grandeur that can only be seen to be appreciated.

WITH these writings, and cutting down descriptive paragraphs to mintue detail, I have barely scratched the surface surrounding the character of Black River. A wonder of nature packed in a nutshell, you might say. We have, by no means, made this journey in one day. In fact, if one should begin this drifting journey down Black River, he might wish to stretch the journey into days, weeks, or a lifetime. It could easily be done. There is one thing for sure, your mind, heart and soul will grasp the bewitching atmosphere of beauty and never let go. If ever a river could be labeled as "scenic", this one could.

At a point near where Pender, Brunswick and New Hanover Counties meet, a river surrenders its name. No murmuring death chant can be heard in its currents, for here it joins force with another great river. Now, by marriage of nature, the two are one . . . Cape Fear River. The journey continues . . . a roar of surf . . . the end. ◆

Curley, Jr. Goes Home

by Sgt. Lew Mitchell
USMC



U.S. MARINE CORPS PHOTOS

MCAS, CHERRY POINT, N. C., February 15—Number 5621, alias Curley Jr., has been released from captivity.

Curley Jr., a female black bear which had been in captivity since November 7, 1972, has been freed in Camp Bryan (a private hunting reserve) to fend for herself after overcoming a broken leg.

"It was about 6 p.m. at night. I was driving home from Camp Lejeune along Lake Road when I spotted an object lying in the road," stated Mrs. Mary Miller of 948 Sunset Drive, Havelock. "When I first saw it, I wasn't sure what it was, so I backed my car up and shined the lights on it. I still wasn't sure. I drove home. My husband and I returned to the scene. It was a bear! He had crawled onto the shoulder of the road."

Mrs. Miller added, "I left my husband with the bear and drove back home to call the state authorities and Mr. John "Curley" Brazelton.

"It was decided to take the bear on base. Mr. Willard West, local Wildlife Protector, and Brazelton took the bear to Captain Walter "Doc" R. Westbrook, the base veterinarian," concluded Mrs. Miller.

Doc Westbrook continued, "When the bear was brought in, it was near unconsciousness. She was suffering from a broken left leg. I had to cut open the leg and insert a stainless steel pin in the leg and rejoin it in a minimal amount of time."

With the operation completed, our friend the bear was taken home by Brazelton to recuperate.

And away she goes! After Capt. Walter R. Westbrook, base veterinarian, removed the stitches from the young female black bear, the fully recovered bear took off for home in Camp Bryan.

Six weeks ago the pin was removed from the bear's leg, and after weeks of medication the bear was deemed ready for release, after the close of the hunting season.

February 2 marked the date of release. Mr. West, the Doc, Curley Brazelton and friends took the bear, who had gained 20 pounds and one and one half inch claws, to Camp Bryan.

It was the logical place to release her because it was close to where she had been found.

At the release site the bear was again sedated so that she could be removed from her cage. A tag (number 5621) was placed in her ear for identification by the North Carolina Wildlife Resources Commission.

While the bear was out, Doc removed the stitches in her leg.

Amidst joking and trying to keep warm while the bear came out of her sedated state, it was determined that she would make it all right when left in the woods.

Curley Brazelton stated, "I just hope she doesn't find her way back to my place cause she could really consume some food." ⬍⬍

Trapping as a Sport

by Gary Reynolds

WALK along almost any deep, water-filled drainage ditch in North Carolina's fields, and you'll inevitably find widely scattered holes cut into the banks of the ditches. Closer inspection will reveal tunnels leading to the ditch bottoms. For the most part, the tunnel end is submerged perhaps a foot and a half under water. "Runs" further mark these end tunnels, the runs being fairly wobbly troughs and half tunnels, often extending half the length of an entire ditch.

These and other trail markings are apparent in any "active" field ditch, and the most casual observations reward the trapper. These markings are of the well-known muskrat, or "marsh hare". Muskrat trapping is an age-old sport of young country boys, the die-hard young at heart, and those who yearn for a spare dollar from an outdoor hobby that keeps the participant in close contact with nature. However, the so-called animal sympathizer threatens to annihilate this nature-contact art, and recently trapping has come under fire from various sectors.

I've noticed several articles depicting the fur trapper as a sadistic sport lover, torturing defenseless creatures needlessly. These stories denounce trapping, stating that anyone—child, madman or whoever—can set traps, leaving them to catch whatever chances into them, struggling vainly, eventually dying and rotting. Traps are not checked, say the articles; trapped animals go unclaimed, state the authors. Quite an unpleasant picture is painted of the trapper.

How irrationally the non-trapper reacts! Undoubtedly, the people behind this drive to kill trapping are non-trappers. Otherwise, such irrational conclusions about trappers would not result. The trapper, like the hunter, does not wish to eliminate the game he seeks; he would be putting an end to his own activity.

Through the purchase of trapping licenses, he maintains wildlife programs, gamelands, etc. Remove the trapper, and you remove the keen interest in maintaining furbearers; eventually, the areas supporting this type of game would be eliminated. So long as some person or group is dependent on a particular type of game for livelihood, or perhaps even for food, then certainly great efforts will be made to prevent this livelihood from dying out. The trapper, more than anyone, knows and respects the areas maintaining the game he traps; he doesn't eliminate these areas, thus he helps to perpetuate more game.

Look at the accusation about the unchecked trap lines: how could the trapper possibly expect to profit from this? Checking traps daily rewards more handsomely, whereas leaving traps unchecked for several days or even weeks is economically unsound. The sooner one gets his game from the traps, the sooner the traps can be reset and be refilled. As to leaving traps, discarding them completely, that gets pretty expensive. Losing several traps amounts to several thrown-away dollars; no profit there.

The cruelty claimed by the anti-trapping folks is somewhat over dramatized. Admittedly, some degree of suffering may be experienced by a trapped creature; however, in the case of muskrat trapping, the suffering lasts no more than, say, a few minutes, about the time it takes the rat to drown. In muskrat trapping, this is the rule rather than the exception. Normally, when muskrats are caught they will drown, rather than wring and twist on dry land as described by the anti-trapping accounts. I caught over twenty muskrats spare-time trapping last season; every one of them had drowned, no clubbing or unnecessary agony for the muskrat involved. And while it is true that anyone can purchase traps, so can anyone purchase knives, pellet guns, and obtain pets—animals at the mercy of any child with a knife, baseball bat, or wad of line, or fishing hooks and equipment, an infinite collection of torture weapons that *could* and often *do* cause pain to helpless creatures.

Muskrat trapping is much older than this country, and the natural tendency to maintain tradition, to maintain that special close dependency on nature, insures special precautions to maintain trapping. Is muskrat trapping necessary today? First, of course, man has created a demanding society. No, fur coats are not necessities, but man's society has created many, many pure luxuries. So long as we maintain this type of society, the skins of animals will be in demand; so long as a commodity is in demand, suppliers will supply it and be paid for doing so. Thus, so long as a livelihood can be obtained from trapping, it will continue. And, for those people (and there are still many) who receive direct nourishment from the muskrat, trapping will continue. Even sweeping all this aside, there is still that precious need of maintaining dependency —true dependency—on the natural wild, and muskrat trapping is just one of those ways to reinforce this. ⬍

Have You Seen The Monk?

U.S. BUREAU OF SPORTS FISHERIES & WILDLIFE

THE handsome and charming monk parakeet, which is a pigeon-sized parrot, has escaped or been liberated from life as a pet and is beginning to establish itself in cities, suburbs and woods in various sections of the U.S.

The monk parakeet, abundant in South America, is one of the most destructive birds in the Western Hemisphere. It has a much higher potential for nuisance and damage than such imported pests as the starling and English sparrow. And it is quite prolific; a single pair of monk parakeets can raise 40 young in a single season!

The birds have caused serious problems in England and Argentina. Flocks of these pests can destroy as much as 45 percent of crops of corn, sunflowers, millet or fruit.

They often are quite aggressive toward other birds and can even intimidate dogs and cats. They threaten, if they become established, to wipe out several desirable species of birds in the immediate area.

The Bureau of Sports Fisheries and Wildlife, alarmed over the possibility of establishment of monk parakeets in this country, is recommending a ban on importation of the birds and would like to eliminate them wherever they can be found.

Monk parakeets are about a foot long, similar to the mourning dove in size. They have a greenish-gray back, with a lemon yellow belly. The breast and forethroat are quaker gray, with darker feather edges. Wings are blue gray and the tail is bluish green, long and pointed. The feet are dark colored, and both sexes are colored alike. More identifiable characteristics include a large hooked beak and strong resemblance to a parrot.

Large, permanent parakeet nests, constructed of twigs and branches, are used as apartment houses. They contain many chambers used by many pairs of birds for rearing their young or for an overnight sleep. The nests are continually being enlarged, and sometimes get so heavy that they break the branches that hold them.

Monk parakeets are unwary and nonmigratory, though flocks move considerable distances to raid crops. They are gregarious throughout the year, flocks of 15 to 50 normally traveling in a loose aggregation. Their flight is swift—usually about 30 feet high—and wingbeats are rapid.

If these birds become once established, control is impossible. Methods used in Argentina included nest destruction by fire, shooting, snaring, netting, toxic baits and repellants, and bounties. One Argentine province paid bounties on 427,206 pairs of feet in two years. The number of birds increased.

Anyone spotting a monk parakeet is requested to notify the State Supervisor, Bureau of Sports Fisheries and Wildlife, P.O. Box 25878, Raleigh, N. C. 27611. ⬍⬍

A Look At North Carolina's Endangered Wildlife

Part 3

by Dr. Rowland Shelley
Raleigh

This month, we present the list of mammals considered by the Endangered Species Committee to be either rare or endangered in North Carolina. Many are simply on the edge of their normal range here, while others are being jeopardized by habitat destruction.

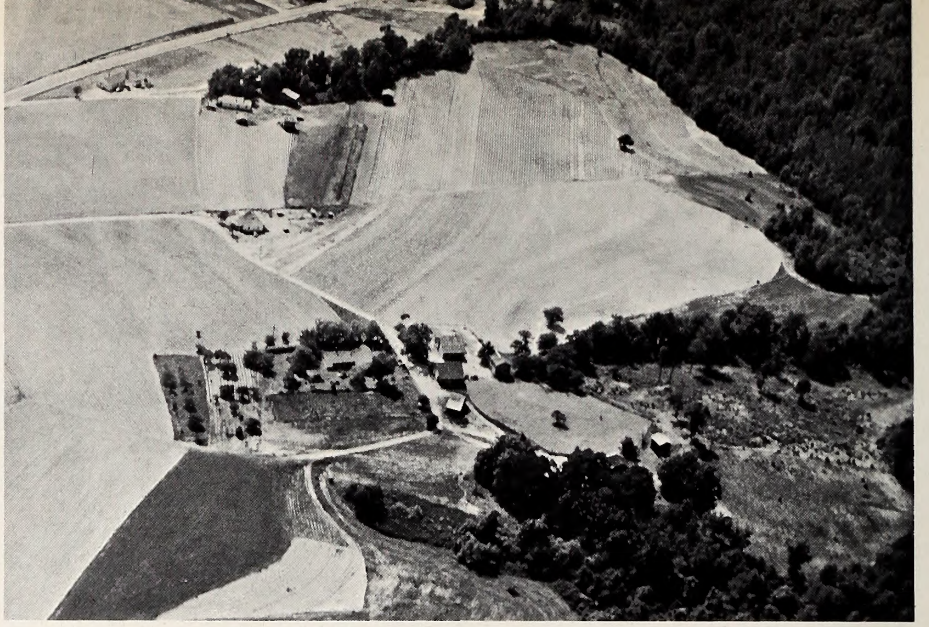
Species	Range In N.C.	Preferred Habitat	General Comments	Projects Affecting	Status
Sorex longirostris fisheri Merriam Southeastern Shrew	Dismal Swamp		Endemic	General clearing & draining swamp	Endangered
Blarina telmalestes Merriam-Swamp Short-tailed Shrew	Dismal Swamp		Endemic	General clearing & draining swamp	Endangered
Sciurus niger bachmani Lowry & Davis-Fox Squirrel	Cherokee & Graham Cos.		N.C., range periphery		Endangered
Synaptomys cooperi helaletes Merriam-Southern Bog Lemming	Dismal Swamp		Endemic	General clearing & draining swamp	Endangered
Felis concolor cougar Kerr Cougar	Eastern Swamps Western mtns.		Probably extirpated. N.C. northern end range		Endangered

Several of the wood rats appear to be scarce also. The range of mammals is from the very small to the large, as represented by the mysterious cougar.

Some of the mammals considered rare or endangered are seldom seen by many of us. The tiny shrews are secretive little animals at best, living in seclusion.

Species	Range In N.C.	Preferred Habitat	General Comments	Projects Affecting	Status
Myotis austroriparius mumfordi Rice Southeastern Myotis	Western N.C.		N.C. range periphery		Rare
Myotis sodalis Miller & Allen Indiana Bat	Western N.C.		N.C. range perpiphery		Rare
Mustela nivalis allegheniensis Rhoads-Least Weasel	Western N.C.		N.C. southeastern end range		Rare
Microtus chrotorrhinus carolinensis Komarek Rock Vole	Western N.C.	Mountain balds, meadows			Undetermined
Sorex c. cinereus Kerr-Masked Shrew	Western N.C.	Highlands plateau			Peripheral-Undetermined in N.C.
Sorex palustris punctulatus Hooper Water Shrew	Western N.C.	Wet bogs			Peripheral-Rare in N.C.
Sorex fumeus Miller-Smokey Shrew	Western N.C.	Moist deciduous forests			Peripheral-Undetermined in N.C.
Sorex dispar blitchi Schwartz Long-tailed Shrew	Western N.C.	Rocky substrate			Peripheral-Undetermined in N.C.
Microsorex winnemana Preble Pigmy Shrew	Western N.C.	Deciduous forests			Peripheral-Undetermined in N.C.
Myotis s. subulatus Say Small Foot Myotis	Western N.C.				Peripheral-Undetermined in N.C.
Dasypterus floridanus Miller Yellow Bat	Eastern N.C.		Migratory bat		Peripheral-Rare in N.C.
Neotoma f. floridana Ord Wood Rat	Smith Island	Swamps		Development of Island threatens species	Peripheral-Endangered in N.C.
Neotoma floridana haematoreia A.H. Howell-Wood Rat	Southwest corner N.C.				Peripheral-Undetermined in N.C.
Neotoma floridana magister Baird Wood Rat	Northwest corner N.C.				Peripheral-Undetermined in N.C.

PESTICIDE SAFETY



The following is a speech by Robert W. Scott, Executive Vice President of the N. C. Agribusiness Council, to the N. C. Rural Safety Council Meeting, April 27, 1973.

Let me begin by extending my congratulations to the 12 winners of rural safety awards for 1973. You represent organizations that not only can make rural North Carolina *safer,* but organizations that can *make* or *break* rural North Carolina.

And when I say rural North Carolina, I'm not referring to a tiny segment of our state. I'm referring to a majority of our state, for North Carolina is still—thank goodness—a state of many wide open spaces and many small towns. The 1970 Census officially classified our 5.1 million citizens as:

—45% urban, and
—55% rural, which includes everyone living outside of a town with at least 2,500 people.

This balance between rural and urban population is a desirable situation for many reasons. I like it and I hope you do. If so, you can help to maintain it by continuing your efforts to make rural areas safer, and, thus, more desirable places to live.

Your task is immense, for rural North Carolina has far more than its share of accidental deaths and injuries. Agriculture, forestry, mining, fishing—our primary rural-based industries — have long been noted for their high accident rate. Look at the percentage of all our drownings, accidental shootings and pesticide poisonings that occur in rural areas. Last year, 1,980 people died on our highways. Almost 1,600 of these deaths—about 80 percent—occurred in rural areas. Even 75 percent of the pedestrians who died on our streets and highways were killed in rural areas.

So, your educational task is immense. You have many safety problems to tackle, and, unfortunately, safety is a difficult product to sell. The same old tired slogans are not going to do the job. You've got to be imaginative in your safety messages and programs. And you've got to be willing to stand up and be counted on such crucial safety issues as the drinking driver, who figures in over half of our highway accidents.

In attendance here today are representatives of many public and private organizations that have safety programs. I commend you and your organizations for your concern. But, let me pay special tribute to two organizations represented here that are usually called to the scene after safety has been neglected.

I'm referring to our volunteer fire departments and our rescue squads. The growth of these two organizations in North Carolina has been nothing less than phenomenal. It is difficult to realize that within the past 10 years the number of rescue squads in this state has increased from 43 to over 300. And not only do we have more squads, but they are better trained and better equipped. Local leaderhip and local initiative, such as Jerry Adams has shown, is the major reason for this phenomenal growth in the quantity and quality of our rescue squads.

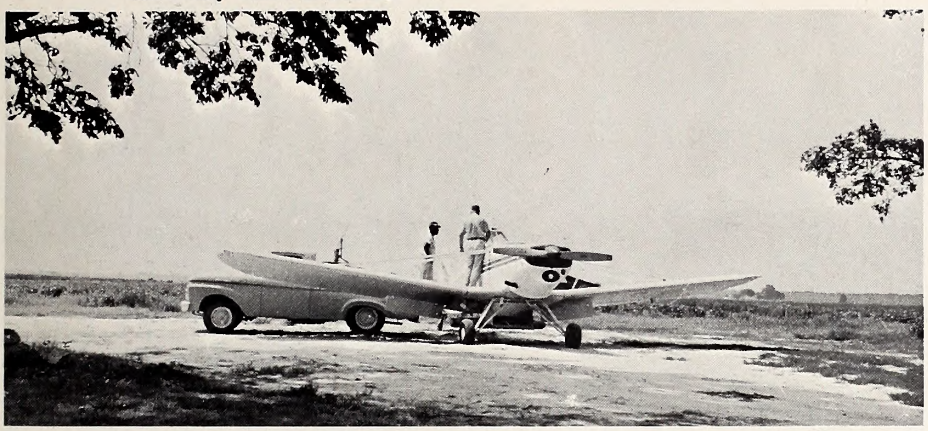
The growth of fire departments—in both number and capabilities—has been equally exciting. From 225 fire departments in 1955 we have just passed in North Carolina the 1,000 mark in organized fire departments. And most of these departments are in rural areas. In fact, out of the 38,000 firemen in North Carolina less than 10 percent are paid. The remaining firemen are like Earl Gatlin here: they are volunteers.

Your theme for this meeting—Pesticide Safety on the Farm and in The Home—is certainly a timely one. The topic has already been expertly discussed. My personal belief is that pesticides are essential to man's welfare, and I make this statement cognizant of the fact that pesticides have sometimes damaged our environment and they have occasionally injured man himself; primarily because of misuse.

Despite improved farming practices, including the application of pesticides and fertilizers, world food production has barely kept pace with the growth of population in this century, and half the world's population today has an inadequate diet. Food supplies will have to be doubled in the next 30 years to achieve even a moderate advance in nutritional standards.

To deny pesticides to agricul-

Providing adequate food and fiber is the responsibility of the Tarheel farmer. The careful use of various pesticides must be considered when meeting these agricultural demands. Aerial spraying (below) must be carried out with utmost care and then only when necessary.



ture would be to court disaster and to imperil the lives of tens of millions of people in Asia and Latin America. Even here in the United States, where farm labor is becoming increasingly scarce, the use of pesticides is an important factor in enabling farmers to market, at a reasonable price, the high quality of produce expected by a modern housewife.

Talk about high food prices, we would really have them without pesticides. We would have to readjust our entire way of living. A back-to-the farm movement would be necessary in order to provide the food and fiber that this nation requires. The net result would be a reduction in our standard of living.

In making these comments about agriculture, I would like to remind you that farmers use only about one-half of the pesticides used in the United States. The other half is used by industry, homeowners, and others.

So, we are faced with the dilemma of needing pesticides, while recognizing that they can hurt us and our environment. What are we going to do?

First, we must reduce and hopefully eliminate the chronic and sometimes acute poisoning of man and wildlife. I am referring to the tobacco workers who become ill from working in fields treated with parathion. Or, the little child that dies after drinking pesticides that have carelessly been put into a Pespi-Cola bottle. Or, the fish kill that occurs down stream from where an industrial firm has discharged a harmful chemical. These are the kinds of tragedies that your organization can help to eliminate or reduce through education and regulation.

Secondly, we must eliminate or reduce broad spectrum, persistent pesticides where possible. In other words, we must think about more than the immediate bug to be killed. We must also think of "off-target" organisms and the long range environmental effects of pesticides.

Thirdly, we must look for ways to reduce pesticide usage. Farmers, gardeners, and even housewives often use more pesticides than are really necessary. We may need to accept a few bugs and not try to kill them all. We must also search for nonchemical ways to control pests when possible.

This means appropriating more funds for research to seek useful alternatives, new methods, and to determine costs and benefits of new methods of pesticide control.

So, let's work to avoid accidents with pesticides. Let's reduce those pesticides that can damage our environment, and let's search for nonchemical as well as chemical means for controlling pests.

If we will do these things, I believe we can enter a new era of pesticide use in this country —*the era of sensible pesticide use and control.*

You know, DDT was actually discovered way back in 1874—99 years ago. But its insecticidal properties were not realized until 1939. And it was not until the end of World War II that the use of DDT and other pesticides began to skyrocket. You might say that an era of more or less carefree, mushrooming pesticide use began about 1945 and continued until 1962 when Rachel Carson published "Silent Spring."

"Silent Spring," more than anything else, ushered in an era of intense pesticide debate and controversy. Anti-pesticide forces and pro-pesticide forces made charges and counter-charges. The debate eventually reached the halls of Congress and the halls of our own General Assembly. The General Assembly responded by passing the North Carolina Pesticide Act of 1971 and Congress responded by passing last October the Federal Environmental Pesticide Control Act of 1972. So, government at both the state and national levels has responded. The mechanism has been established for what I believe could be an *era of sensible pesticide use and control.*

This does not mean that the problem of pesticides is solved. The regulatory agencies that have been established do not operate in a vacuum. They respond to information and problems brought to them. This means that we must still be alert to the extremists on both sides. We can neither be careless nor carefree in our use of scientific knowledge of how to control insects, weeds or other undesirable plants, nor can we abandon the concept that proper use of pesticides are essential to the well-being of our society.

Also, the need for pesticide safety education has never been greater. Many of the new chemicals that are replacing chemicals like DDT are extremely toxic. We must intensify our efforts to see that these are used safely.

I challenge you to work together to make 1973 the beginning of the *era of truly sensible pesticide use and control.* ⬍⬍

BUTTERWORT

CARNIVOROUS PLANTS

By Alan Kocan

PHOTOS BY THE AUTHOR

OF all the plants in the world, the plants that kill in order to eat are among the most fascinating. These plants have long interested biologists, and, even today, observations made by Charles Darwin on the Venus' Fly Trap and other carnivorous plants stand as some of the most comprehensive observations conducted on these unique plants. Many questions such as why these plants exist, what their role is in the ecology of the areas where they are found, and why they are only found in the southeast, and especially in an area adjoining the Carolinas, are still not completely understood.

It is thought that these plants feed on insects as a means of compensating for deficiencies found in the soil. The soil of some of the savannah areas of the Carolinas is indeed deficient in some nitrogen and phosphorous compounds necessary for the growth of most plants. Since these plants are not found in other areas where these compounds are available, it seems likely that these specialized plants have compensated for the soil conditions by engaging in carnivory. This is undoubtedly not the only factor which has led to the evolution of these strange plants, but whatever the factors are that have led to it, the swamp area of the Carolinas has produced an ideal location for all of these rare and fascinating plants.

Of all the carnivorous plants, the Venus' Fly Trap is perhaps the most familiar. This plant, which grows exclusively in an area bordering the Carolinas, was such a favorite of Charles Darwin that he called it "the most wonderful plant in the world". The brightly colored leaves are equipped with tiny hairs that when triggered, cause the "trap" to close, entrapping the prey. These hairs must be triggered twice, however, before the "trap" will close, thus prohibiting the closing by some type of artificial stimulation.

The pitcher plants, although closely related, each have their own individual means of attracting prey. The purple pitcher plant attracts insects into the trumpet shaped leaves by means of a trail of nectar which leads deep into the base of the leaves. At the base of the funnel is located a digestive fluid which also contains an anesthetic which keeps the insects

YELLOW PITCHER PLANT

An interesting facet of our outdoor is that of the carnivorous plants, so are unique to our Southeast area. them, and help insure their surviva

from getting free while they are being digested. The yel pitcher plant has tall trumpet-like stalks with a cap over top that shades the trumpet openings. Insects are lured the trumpet by a trail of nectar and the cap prevents di sunlight from entering the stalk, thus confusing the pre causing it to tire and fall to the base of the trumpet. Th hooded pitcher plant attracts its prey by means of the li colored spots at the back of the trumpet. Once inside, t insects are again confused by the cap that shades light the trumpet opening and the prey falls to the base of th trumpet.

Other carnivorous plants that actively trap their prey are the sundews and butterworts. The small attractive s catches its prey on the sticky hairs of the leaves. Once prey is caught, the leaves close around the prey and di of the insect takes place. The butterwort catches very s insects on the sticky leaves and, like the sundew, the le close around the prey once it is caught.

Because of the limited distribution of these fascinati plants and the unfortunate conditions which have led t destruction of many of the lowlands of our coastal area plants are becoming less abundant. They still remain, a dramatic example of the wonders of nature and the g rewards that are available to the person interested enou become aware of the wildlife of his area and ambitious to get out and observe them.

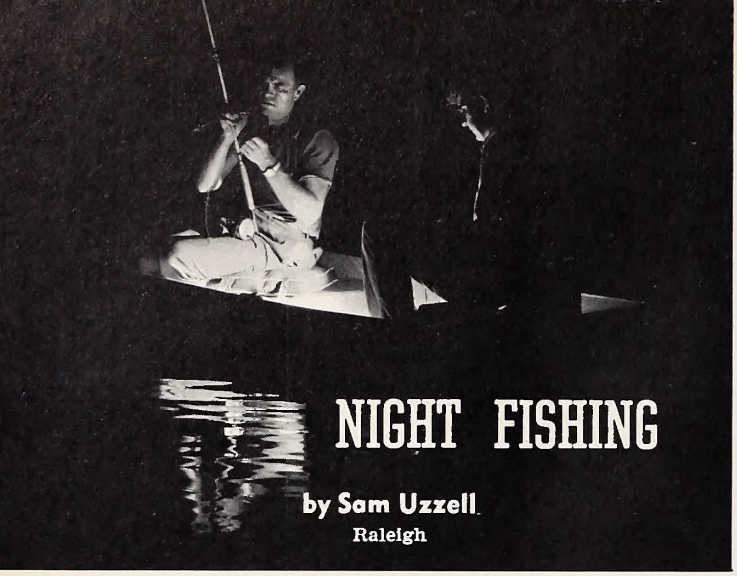
HOODED PITCHER PLANT

VENUS' FLY TRAP

munity
f which
kind to

SUNDEW

PURPLE PITCHER PLANT



NIGHT FISHING

by Sam Uzzell
Raleigh

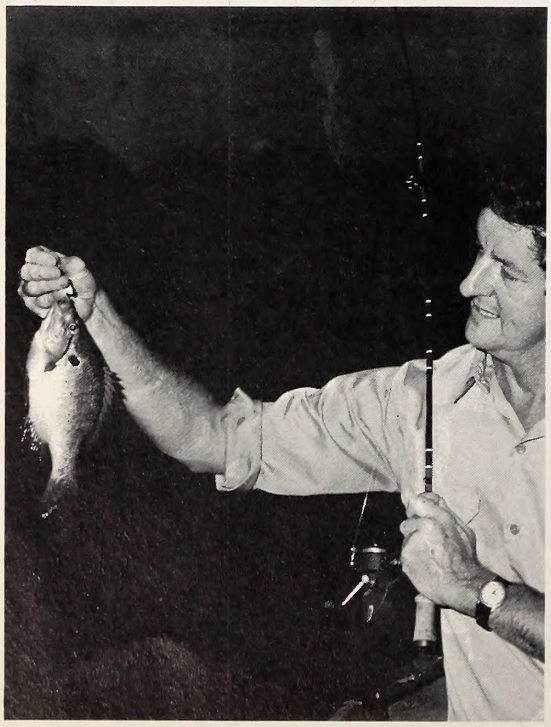
As I was leaving the pond late one July afternoon last year, I heard some sort of racket at the pond's edge. To investigate, I crept through the grass and rushes, and discovered the cause of the disturbance. In the fading light on the shallow water, there were many small fish worrying and nipping at an object under the willow-lined bank. I first thought that it was a popping bug that a fellow fly fisherman had lost.

I looked closer because I get a real charge out of recovering someone else's errant lures. It eases the pain of losing my own. So, the tip of my fly rod was used to bring the object out of the shallow water. A few pokes brought it closer, surprising me to find that the "popping bug" was actually a hapless caddis fly. The small sunfish that badgered the insect kept right on slurping and sucking at the creature despite the interference of my rod.

On the way home, I couldn't help but think about how voraciously those bluegills attacked the caddis fly and why they didn't spook away when I stood over them and fairly frothed the water over them with the rod tip. Since lower light intensity levels make for better bass fishing, perhaps the cover of darkness encourages bream to feed more actively also. In the absence of light, and heat too, larger fish forage more actively in the shallows. Fish are smart enough to know that they are imperiled in shallow water, and they must use the night to cruise for minnows in darkness. Anyone who has ever spent a long afternoon on the water knows the surface becomes alive with fish sipping insects off the top, particularly as twilight eases into night.

Like most anglers, my fishing is confined to the bright hours of day. When night comes and the mosquitos with it, I usually retire to the comforts of home. But there was one Friday, a few days after the incident that I just described to you, that I prepared myself and set forth to fly rod for panfish at night. I armed myself with popping bugs, insect repellent, long pants and long sleeved shirt, 8-½ foot fly rod, oars, boat cushion, and an ordinary flashlight. Thusly equipped, I began what was to be an interesting night.

As I approached the pond as quietly as possible, I looked around to make sure I knew where the likely hotspots and snags were. Soon it would be too dark to see them. The "lure-eating" obstructions were only recorded along with the places that had yielded fish in the past. Stumps, drop-offs, submerged and downed trees, weed beds, and tree-lined banks were the places I would work over first. The pond is not a very good place to catch huge fish, but I have a standing invitation to use the pond and the host's aluminum jonboat. It's only a short ride from my Raleigh home, and I'm not



A little looking around and a few casts before darkness really sets in will pay off later. And the dusk hours may be great times to start things off with the fish. An ultra-light spinning outfit works well at night too. A fat shellcracker fell for a tiny spinner (left).

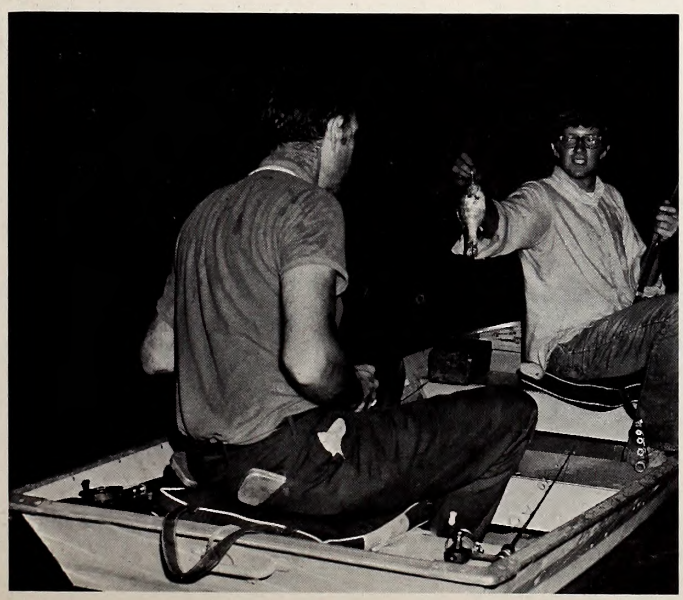
one to turn down any chance to fish.

My first cast was in the direction of a corner of the pond where the bank was shaded by a few small willows and had a drop-off into six or eight feet of water. I had knotted a small white popper onto a home-tied leader testing about six pounds, and cast about thirty feet to a spot under those willows. The lower limbs hung a couple of feet above the water and it seemed a good idea to cast as near to the bank as possible while I could still see. The little white popper settled with a plop and rested only a second or two before it disappeared with a slurp. I twitched the rod tip and was fast to a small bream. The sound that accompanied the swallowing of the bug I knew would be the signal for a strike when it became too dark to see. After releasing the little fellow and dousing again with repellent, I eased on down the shoreline in the boat.

I spent a joyful four hours that night casting into the pitch-black night and through the mist that rose from the pond. As I listened for the sounds of bream taking my popper, I also enjoyed the music of the creatures around the pond. Frogs sang, whistled, and belched as bats and swallows swooped and chased flying insects; owls hooted, whippoorwills whippoorwilled and I could hear an occasional big bass roll on the surface across the way. The moon was all but blocked out by the mist and it was very similar to a steamy shower room but there was no mistaking the pond smell even though the heat and humidity would make you compare the sensations.

It didn't seem to matter what color popping bug I threw out, or how battered and chipped they were. The sunfish hit both new and old bugs without preference. The sound of the popper hitting the surface and the silhouette it cast was enough to elicit a strike. After too many minutes spent with the flashlight propped between my knees studiously extracting a deeply-set hook in too many fish, I wised up and knotted on larger poppers. About the best size turned out to be the diameter of a typewriter key with a number 6 hook. Smaller lures than this were swallowed too deeply. Larger bugs were not swallowed at all and the splash that occurred when they were cast alarmed too many fish.

Night fishing presents some challenges that daylight angling doesn't. You depend on various sounds to denote what's going on. You learn to recognize the "slurp" of bluegill inhaling the popping bug. The author hoists a medium-size bluegill.



Admittedly, I'm not much at setting a hook. Usually I'll haul back on the rod like I'm catching marlin instead of panfish. At other times I'll be too slow and delicate and miss the fish entirely. After long hot afternoons when the fishing hasn't been too good, I'll have a strike and jerk back too enthusiastically and more than once a minnow-sized bream has sailed over the boat. It's embarrassing. But by keeping a fairly slack-free line, the fish will usually hook themselves as they inhale the lure and snap their heads away. I kept a taut line at night and was more successful at connecting with fish than usual. To be sure I gave the rod a twitch as soon as the slurping smack of a bream on the feed reached my ears.

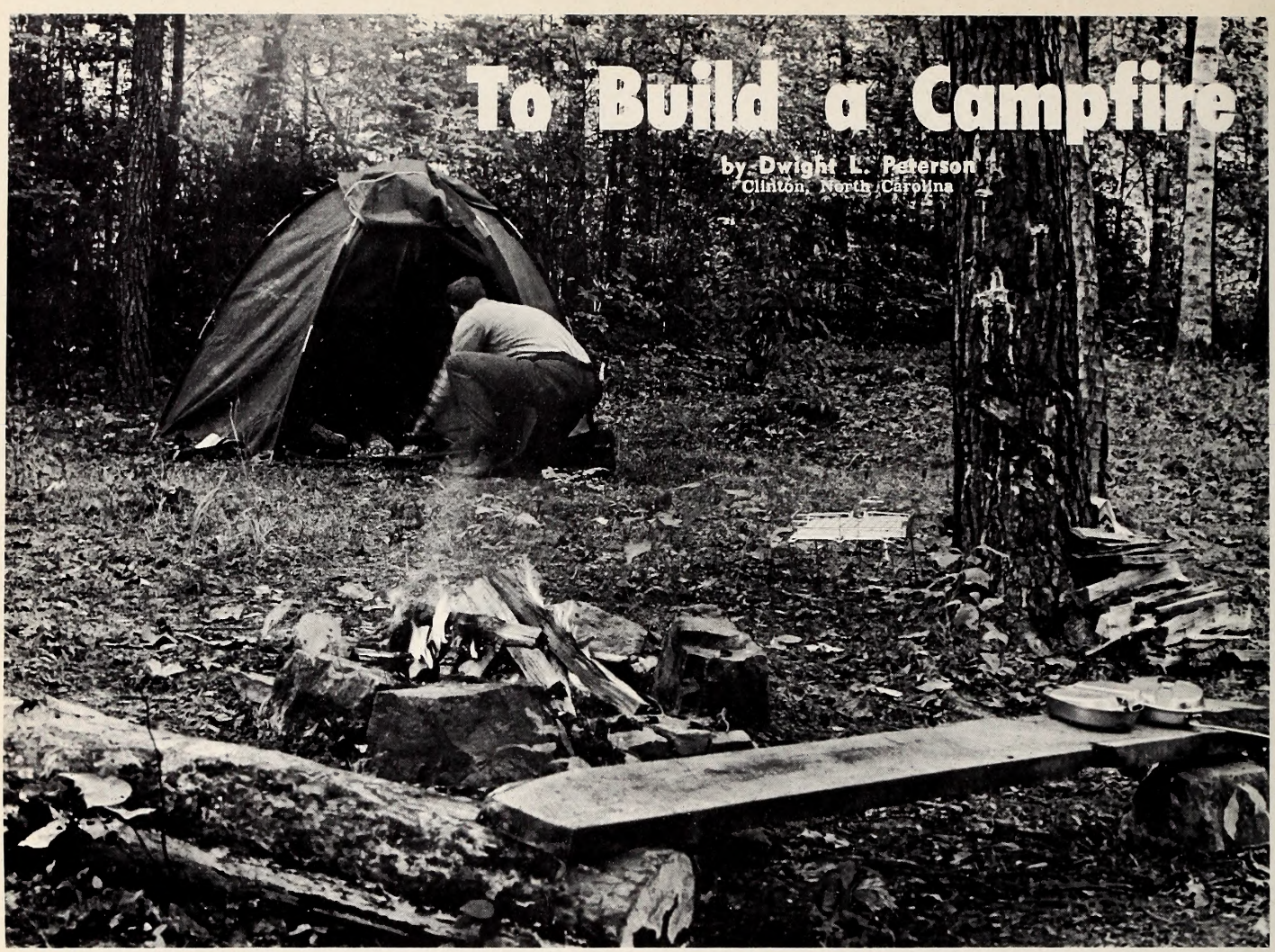
FLY fishing at night is almost the best way I know to spend a midsummer's night. It is often hard to catch fish when the summer sun heats the water up so that the cool, deep water contains fish. There are many differences to fly rodding at night. Some are subtle and some are not, but they combine to make it very worthwhile angling. I certainly enjoyed it because I caught more fish and larger fish than ever before from a relatively poor pond. You'll find gliding along a bank and fishing a cast out into the darkness a suspensful wait until the tell-tale smack of a hungry fish at the end of your line makes you sit straight in the bcat and pay attention.

Fishing is the great pastime enjoyed by millions the world over because when you feel the urgent resistance at the end of a tight line or see the cork bob up and down and out of sight it is the climax of your expectations. You rarely know exactly what and how large it was when you first note that there's something pulling back at you. I have snagged many a stick and almost swallowed my tongue thinking it to be a lunker until the sad truth materializes. I have wrestled in some prize-winning snags before. (When I get the money, I might have one mounted.)

There are not many things that are as much fun to fail as fishing. I've never measured a successful fishing outing by the number of fish taken home. Just getting out and into nature and water is reward enough; many sportsmen share my feelings I'm sure. But, try fishing at night this summer at a familiar lake or pond. You may be pleased at what happens and you might find that you like flyfishing at night better than in the daytime. It's catching either way. ◆

To Build a Campfire

by Dwight L. Peterson
Clinton, North Carolina



TRAVEL AND PROMOTION DIV. PHOTO

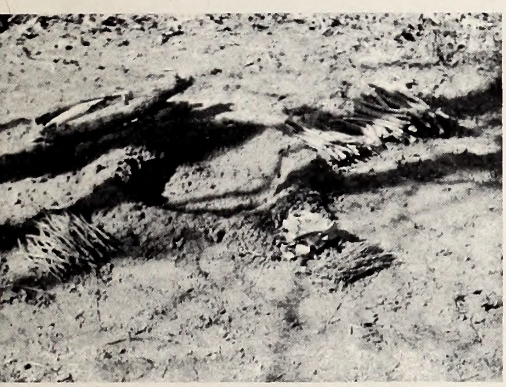
THOUSANDS of words have been written about the procedures involved with building a campfire. The following is by no means the *only* way to build a campfire, but it is *one* way to build a campfire. I use it more than any other method. To become efficient you must do research, experiment and gain experience through experimentation. But (if you are like me) no matter how much we experiment, we are still going to have trouble getting a campfire started in wet weather. There is one consolation and that is, we can better ourselves. What is that old saying? "There is always room for improvement."

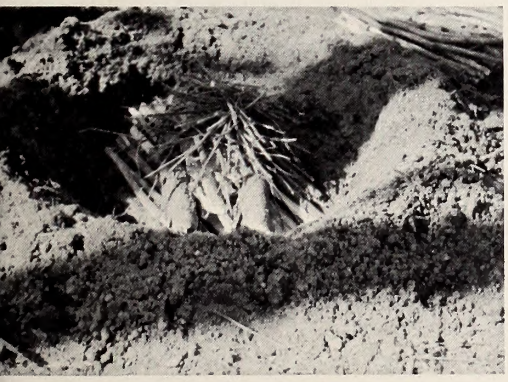
Remember, a campfire is *a campfire*. It is not a bonfire, and should be kept at a size (small size) necessary only to one's needs. Also remember, fire is one of man's most important and useful discoveries, but it can become one of our most destructive forces. Keep safety foremost in your mind.

First, always try to start your campfire with one match. This may seem foolish since you probably have matches in your pocket, some in your pack and some tucked away in odd places to keep them dry. But . . . you never know when the situation may arise when one match is all you have. Proper preparation can bring more consistent success. Have everything ready *before* you strike the match. You will not always succeed . . . so don't pull your hair out. But you will, by trying to use one match, begin forming a very good habit.

Second, clear an area about eight to ten feet in diameter. Remove any material that could be ignited by a spark. With a shovel, belt knife, hand axe or similar tool, excavate a hole in the center of your cleared area. This hole should be about three to four feet in diameter and from three to five inches deep. Mound the dirt you remove around the hole.

"Why dig a hole?" I'm glad you ask. You are right. The hole is not always necessary. You may be on rocky ground and can't dig a hole. Of course you can form a circular formation with the rocks for your campfire. But, as I said, this is one way to build your campfire, not the only way. And I think you'll agree it does have some very good points, such as safety and convenience. Also, if you are camping in an area where there is grass, or the forest floor is covered with beautiful moss,





naturally you don't want to destroy this beauty. Cut the sod into squares or clumps and lay them to one side, out of the way, with dirt and root system still intact. You'll use these later when you break camp.

Third, we must gather material for the campfire. Tinder, kindling and fuel. In all cases we want to find material that is dry, and plenty of it. Later, after the fire is started and really hot, green or damp wood can be used if desired.

Tinder: Shavings from pine heart (also called lighter wood) or a wad of birch bark. Both of these are very good, and will ignite after or even during a rain. Shredded bark from a dead cedar, cypress or juniper tree (cambium layer just under the outer bark) is best. An old, dry bird's nest. A wad of dry pine needles, or a dry pine cone is fair material when the above materials cannot be found. Wood inside the hollow of a tree or wood cut from the heart of a dead tree is usually dry, and can be split for kindling or shavings trimmed for tinder. Wads of dry grass are not so good but can be used as a last resort.

Kindling: Wood from the size of a pencil lead up to the size of the pencil itself. Pine heart split into this size is very good. Dead twigs and branches from the lower portion of trees. Conifer twigs are best because they are more combustible. Such wood found on the ground is not good for starting the campfire because they are usually damp, but can be used later when the fire is started and hot.

The basic steps for building a successful camp fire are shown in the photos on this page. There are other ways to construct a cooking fire, but this is a tried and true method.

PHOTOS BY THE AUTHOR

Fuel: Wood from pencil size up to the size desired for your campfire. Use hard wood (oak, hickory and etc.) since they produce more heat, are longer lasting and produce excellent coals for cooking.

Now, let's go to the fourth step and start our campfire.

Let's assume the ground is damp. We line the bottom of the hole with dry sticks making a foundation for our campfire. Let's also assume birch bark is handy so we gather a handful. We take two dry sticks, about an inch or so thick, lay them parallel with each other and about three inches apart. Place them so the wind can pass through. This will help your fire breathe. Place your handful of birch bark between the sticks. Take your smallest kindling, about the size of a pencil lead, and begin forming a pyramid type formation over and around the birch bark. Use plenty and criss-cross the wood so air can pass through. Put on some kindling about the size of a pencil but no larger. Place your back to the wind, protect your match, strike it and light the tinder. As the blaze catches and your fire is really going, continue adding wood about pencil size. As it grows hotter begin adding larger wood.

Well, the trip's over. Let's break camp.

Let your campfire burn as completely o u t as possible. Sprinkle or slowly pour on water. When you are satisfied it's out, push the dirt mounded around the hole back into the hole. Replace the sod squares just as you would if transplanting sod squares in your lawn. Pour on more water and soak the area around. You can now say you have left the area as you found it. ⬍

Night of the Frog

by William E. Chauncey

DID you ever come in to supper "half starved" and sit down to a steaming platter of—frog legs? That's right! I said frog legs. Succulent, fried crisp, just the right tenderness. If you haven't tried this delicious food, at least go frog gigging once this summer before deciding whether frog legs are repulsive or really good. Here's how to hunt frogs and how to prepare your meal . . .

Equipment

This is a unique summer pastime. It provides hunting when ordinary hunting seasons are long out of mind, and is as much a good conversation piece as any hunt. Frog gigging classifies as a good sport in my opinion, because it requires its own degree of skill. There is, however, equipment not normally used in hunting so it would not hurt to make a list.

Your gun should be taken on a gigging trip only for snakes. Protection should be its only necessity. "Frogging", as it is typically referred to in Eastern N. C., is done for the most part in the dead of summer and the snakes are out, especially moccasins. (I'm referring to the cottonmouth water moccasin, a poisonous snake).

Fortunatly, for those of us who cannot afford expensive sporting trips, frog gigging costs very little. There is little or nothing to buy except a gig point. The gig made for frogs is smaller than most fish gigs such as that used for flounder. It is approximately 5 inches long including the section that the handle fits into, and 3 to 4 inches wide It should have 3 to 5 barbed points, depending on the hunter's preference. Some gigs are sold already complete or you can purchase only the point and make your own handle.

I personally prefer the latter and I make the shaft of my gig from a fishing pole, (cane). I like it 10 to 12 feet long and inverted with the butt end holding the gig. I hold the narrowed end. I construct my gigs in this manner for three reasons: Length, flexibility, and durability. The gig as a whole will be strong yet will bend with the thrust if the gig should go through the frog and hit bottom, rather than shear in two or splinter. I have had the pleasure of chasing many beautiful, green frogs on summer nights and have yet to break a cane pole.

Of course, the handle or shaft can be made from other items as well: an old rake handle, garden implement, or lightweight pipe. I was going on a trip once with a friend and we met two more people who happened to be at the same pond. One of them had his gig handle made from a whittled, sanded tree limb and shellacked! That is some pride for a frog gig and it emphasized how seriously some of us take this particular sport. It can become a favorite in a short time.

Your boat should be as lightweight as possible because there will be times when you will be in only 5 or 6 inches of water. You want a shallow-draft boat such as a small creek boat made from plywood or aluminum and aluminum would not be the preference of these two because it is noisy. It is better than a heavy timber boat which is just too much to handle if you should "pond-hop" (move from pond to pond during the night). Plywood then, is your best answer for a boat choice. It should be noted that gigging can be done by walking the banks but I think it would take a good American Indian to have any decent luck! If this will be your first trip, try staying with the boat idea.

A paddle should be taken along for any deeper spots in the pond acreage, but for the most part, a pole will provide ample control of the boat. This pole should be a very sturdy one of any type you choose but not so heavy as to tire you in 6 or 8 hours. Also. it is a very bad idea to pole the boat with your gig!

Where To Start

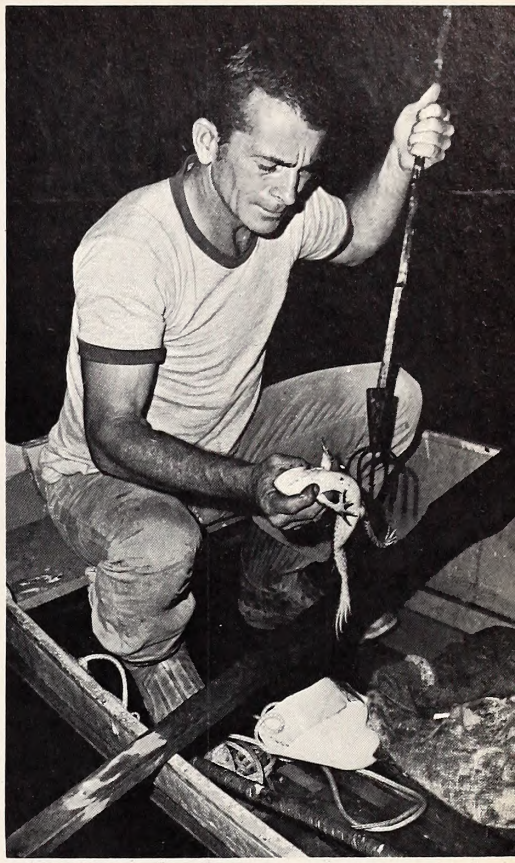
The pond or swamp you choose to hunt should have several characteristics which are worth mentioning. The first thing to look for is vegetation. Many farmers in our area have irrigation ponds in their fields. They are sometimes no more than mounds of earth, with water where the earth was, and no vegetation. This is not the place to go gigging. It will be a good frog pond later, but not until the growth comes. A pond "looks good" for frogs if it is grown up with small bushes and trees, weeds and brush. There should also be what I call "marsh grass" around the water's edges, on the banks and even in the middle in places.

Another thing which seems to add to the atmosphere and provide shelter for frogs is felled, small trees or tree branches. This seems especially so if the limbs still have leaves, moss or vegetation around them.

As you may already be aware, there is a North Carolina State Law requiring any landowner's permission before his land can be hunted . . . .

In a last reference to the particular place to hunt, look for general shallowness of the water. Gigging in deep water is very difficult. I gave up this practice after short lessons in lost or wounded game. The gig should be able to hit bottom after going through the frog simply to make sure you have him! In deep water, the frog may or may not stay on the gig point and if he comes off wounded with a vital organ hit or the air sac inside his body punctured, he will only sink—a total waste. As a rule, bullfrogs are very tough, hard to kill, but enough can be lost in deep water as to make the practice unworthy.

A small fisherman's net should be taken along for two reasons:



Locate the frog, ease up to him, slowly move the gig forward until it is only a few inches away . . . and then hit him! Stealth and care often make up for other errors. But even then you'll miss a few.

PHOTOS BY TOM ROLLINS

One, you may kill a frog with a thrust as mentioned above but sometimes lose him as you bring the gig up. Although I don't consider 12 to 14 inches of water too deep, it can be difficult to see a frog if he lands stomach down. His underside is white but his back is well camouflaged both in and out of water. This is even more emphasized if you're in murky water. The net may retrieve your game for you.

The second reason for a net is that there just may be a hungry snake after the same frog that interests you! I've heard that they cannot bite under water but have never been brave enough to test this heresay!

If there is any such thing as the most important piece of equipment, it is the light. Your light must naturally be waterproof and it should throw a powerful, narrow beam. The light I like best is an automotive headlight. An old battery can be charged for a day and used all night if it has no dead cells or leaks. Always take extra flashlights though, because if your light fails you and you only have one, the hunt is over . . . .

There are finally two items to be taken on your trip for personal comfort. Something cold to drink! Soft drinks, tea, and I usually take along some milk in case of indigestion from exciting catches or too many soft drinks. Put a partition in your cooler before putting in the drinks and ice. The legs will have to be kept on ice during the hunt, and they can be kept on the other side.

As you can see, for good improvising hunters, not much money is required for this type of hunting. The next item, however, is worth any you might spend!

And this comfort item is INSECT REPELLENT. Do not forget it! It is nearly as indispensible as your hunting light. Without it, I can assure you a hunt of misery which could have been fun. Eastern North Carolina has many watery areas, swamps where bugs and mosquitos breed, and they thrive in the heavy air

of summer's sweltering nights. "Off" and "6-12" are both good repellents you can use to "bathe" in.

Hunting In The Night

It will soon be dark! Now is the time to load up the gear and head for a pond or body of water which you have ALREADY chosen and know the exact route to. You want to arrive just after dark because the frogs will be out "in force", ready to feed.

Load the boat in the back of a pickup truck, station wagon, or put it on top of the car with an old blanket underneath. Put the other equipment inside the vehicle and the gig out the window like a fishing pole.

When you get to the pond find a place on the bank that is not high or steep and hand-carry the boat to the water. Put the rest of the equipment in the boat quietly, then get in. The man who will do the gigging will also handle the light and the other hunter handles the boat. If it is a boat with a pointed bow, this is where the most control can be maintained while the gigger has plenty of room at the stern to put lights, net and cooler. In other words, as you move along, the boat will be going backwards from what it would be if you were on a creek with an outboard attached.

Now, after everyone is situated, sit still for a few minutes while shining the light around the edge of the water. Move the light beam around the perimeter of the pond right where the bank and water meet. At the water's edge, spaced apart 2 or 3 feet and sometimes less, you will see pairs of yellow-green dots that look like small lights themselves. These are the frogs' eyes and the means you use to guide yourself to them. Their bodies are camouflaged as I mentioned earlier and you will be able to see nothing but the reflection of their eyes until you are very close.

After you have been in the water at your point of entry for about 10 minutes, move slowly to the middle of the pond, and then straight on across. Begin hunting well away from where the boat was put in the water for the simple reason that any game which was at that place, went under when you came near. The frogs will jump in if they can see or hear you. This is a good time also to mention this: I have always had very poor luck trying to gig frogs on moonlit nights. They can see very well, so this type of hunting should be on black nights, when the hunter's light commands the greatest advantage.

When you approach the bank, you will be able to see the frogs well enough to determine which one is largest and this is the one you want. The boat is always moved very slowly and with as little unnecessary movement and noise as possible. Human whispering does not seem to bother them but loud talking or yelling will. The hunter with the gig indicates to the control man which one he is after and the boat is steered directly toward that particular frog. The gig is held as if it were a spear and aimed constantly at the frog's midsection until the moment for the thrust arrives. All the while, the light must be held steadily in the frog's eyes. If it flickers away from him for a second, he will be in the water and long gone. I have had my gig point as close as 1 to 2 inches before thrusting.

Now, at the right time, thrust the gig hard! Hold it down (through the frog), and on the bottom until the boat strikes the bank. The thrust and the stoppage of the boat is almost simultaneous. If you do not like the idea of hitting the bank and backing up to go again, you can maneuver the boat parallel to the bank but when you get a frog, you will have to stop anyway to get the frog in the boat, off the gig, and to cut the legs.

The frog is in the boat. Sever the spinal cord to kill it, grab him by the back legs, put your shoe against the gig and over the frog's head, and pull the gig back. Next comes the squeamish part. With a sharp knife, sever the legs just below the hip joint. If you cut above the joints, you may open the body. This makes for one messy boat. Even after cutting a frog's legs off, he may twitch. If he is cut correctly, he will bleed little. Place the legs on ice and place the refuse in a bag to be disposed of later.

Once you have established a pattern for going around the pond, it may seem that too many frogs are beginning to jump before you can get to them. If this is the case, stay still for awhile and then change the pattern. Frogs hide when frightened like any other wild creature, but they do not stay hidden as long. If a noise is made, their croaking may become quieter for a short time but soon they will be "baying" as loudly as before. They will remain out feeding as long as it is dark, but as day comes near and their voices reside, it is time to quit.

The Meal

Fried frog legs are considered a delicacy. They are usually expensive in any good restaurant and more than most people would want to pay, so I would like to prepare you a frog leg dinner that is hard to beat anywhere! These are the legs you captured yourself and that always make any game better.

The skin on the frog legs must be removed. It is not a difficult task. Get a pair of pliers and get a good grip on the edge of the skin where the cut was made. Try to hold onto the bone and meat at the same time with the other hand and merely pull down. The whole skin will come off clean most of the time. If the foot is cut off first, the skin comes all the way off and nothing is left but white meat that looks like a shrimp.

Prepare your other dishes first. The legs will have to be cooked last. Make a dish of steaming wild rice, along with cole slaw, field peas, and corn bread. These are excellent side dishes but can be substituted with other dishes of your choice. The same dishes are eaten with frog legs as are eaten with fried chicken. While

• **FROG continued on page 26**

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

National Hunting and Fishing Day September 22

It's none too early to start preparing for National Hunting and Fishing Day in your area. For some help and where to get it, check page 27 of this issue.

Wildlife Artists Take Note

The Fifth Annual Wildlife Art Exhibit has been announced by the Wake County Sportsmen's and Wildlife Club. This year's event will be held November 29, 30 and December 1 at Raleigh's North Hills Mall. Artists interested should contact Rick Crumpler, 2209 Drewer St., Raleigh, N. C. 27608, for details.

Wildlife Magazine Subscription Contest Winners

The top four magazine sellers in the 1973 WILDLIFE IN NORTH CAROLINA contest are: first, Shelton L. Brickhouse; second, A. Eugene Jones; third, Charles J. Smith; fourth, Kay J. Dunn. Over 13,500 subscriptions were sold during the contest period.

Some Migratory Game Bird Seasons Announced

The Wildlife Resources Commission at its July 9 meeting, selected the following seasons from the frameworks offered by the Bureau of Sports Fisheries and Wildlife: Rails and Gallinules, September 1, to November 9; Woodcock, December 8 to February 9; Common snipe, November 17 to January 19; Doves, (split season) September 1 to October 6, and December 11 to January 12. Waterfowl seasons will be announced later.

Need a New License?

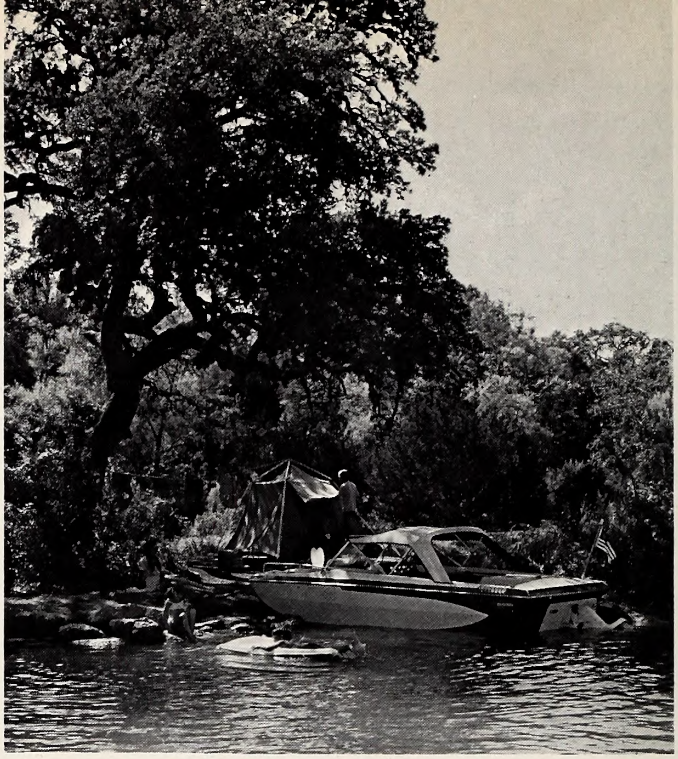
Combination Hunting and Fishing licenses expired July 31; check and see if you need a new one.

Help Chart The Arrival of Fall

Your help is needed in reporting leaf coloration dates of tulip poplar and red maple. Send your name and address to the N. C.PHENOLOGY PROJECT, c/o Dept. of Botany, UNC, Chapel Hill, N. C. 27514. Forms and instructions will be sent to you.

Stem to Stern

BY ED JENKINS



Most of us have that longing to "get away from it all," but seldom do we really get much of a chance. One of the best ways to achieve this in our day of crowded campgrounds is to take a boat camping trip.

In the last decade a growing fraternity of outdoor lovers rediscovered nature through boat camping.

Instead of motoring to their overnight locations, boat campers stow their provisions onboard and, with outboard boat or canoe, find primitive spots where they can enjoy nature at its best without the congestion of so many advertised campgrounds.

The Johnson Motors News Bureau offers these suggestions for pleasant boat camping.

Many owners of larger outboard boats have found ways to convert them into campers. A large piece of plywood stretched across two seats can make a nice support for a sleeping bag and air mattress. Portable stoves and insulated coolers often can be slid under seats. For these boaters, boat camping doesn't always depend on finding a suitable campsite on ground. And your boat camper can come in just as handily as a sleeper while driving to your launch site, saving a motel bill or two.

But most boat campers use their boat as a place to load their gear and as a pleasant way to search out their own unspoiled, often virgin, campsite.

For those who are trying it for the first time, make your trip a one or, at most, a two-nighter. This will be an excellent primer course for the extended boat camping trip of a week or more.

Try to learn ahead of time how much weight your boat can safely handle, counting the weight of the people. Making sure not to overload your boat, put all your food into one package, your tent and bed rolls in another, and clothes and miscellaneous items in a third package. This will make for organized camp set-up. If possible enclose each package in a waterproof tarp; or tie a big tarp down over all three packages. It's a good idea to place plywood slats on the floor of your boat to keep your gear above any water that could accumulate on the floor.

Unfortunately very few of our rivers and lakes are as clean as they used to be. So always carry your own supply of water if you plan to camp a distance from an approved source of drinking water. Plastic Clorox bottles with handles are good for this. Sporting goods stores also offer water carrying items.

Buy dehydrated or freeze-dried food as much as possible. This cuts down weight. If you have to bring canned food, use concentrates. Often you'll be able to supplement this diet along the way if you find a store or a shoreline farmer with fresh eggs and vegetables. And, with a little luck, the fisherman along can add fresh fish to the dinner table.

A safe, enjoyable trip afloat . . . that's what we're all looking for. To help you have such an outing on the water, the Wildlife Commission has made available some aids for every skipper. For your free material, write SAFE BOATING WILDLIFE COMMISSION, RALEIGH, N.C. 27611.

The response to a letter in our June "Crackshots" section about trapping, was as great as any we've had in some time. We print here but a few of the letters we received, and regret that we could not use all of them.

Dear Sir:

I am a trapper and I have always abided by the laws of my state. I feel that it's not fair for hunters to have the right to use dogs to chase raccoons all year round and have all the privileges while other citizens just have three months to trap, and then they are even begrudged that.

Most trappers use these animals for food or sell their skins to help support their families. I myself have seen beavers, raccoons, otters and all sorts of animals lying around rivers, ponds and canals that have been devoured by dogs or shot by deer, raccoon and bird hunters. Their carcasses just lie around doing no one any good. Talking about sport, I don't call that sport at all.

Many times I have been asked by farm owners to trap their ponds for muskrats to keep them from filling up their ponds.

I have had game wardens come and ask me and my partner to trap canals for beaver and other outlets that were being blocked by different animals. They were having complaints from farm owners that their crops were drowning because of blockage caused by beaver and otters. Others were complaining about their corn being eaten by raccoons.

I don't know where Mr. Carr (June "Crackshots") got his information that you can trap without license. Here in Robeson County we have about ninety days to trap, and also we have to have a license. We have fine sportsmanship here. Our game wardens are some of the finest men anywhere.

Tilman J. Rice
Lumberton

Dear Sir:

I would like to answer Mr. George Carr's letter in the June WILDLIFE. In the first place, Mr. Carr should know that there are licenses to buy to set steel traps. He just saw a little boy set a trap that didn't understand.

Trapping has been going on ever since before Daniel Boone and I hope will keep on going. Lots of people depend on trapping to help them through the winter months, and if there were not some caught I don't think farmers would have much chance; they eat the corn and beans.

Mr. Carr, traps are set in a special place and in a special way and a trapper tends his traps every day. Where do we get our fur coats and so forth if not from the fur animal.

There is also a tax collected on these licenses. Go in any hardware store and you can find traps, you would think Mr. Carr had never seen a trap. Yes, I love animals too.

Sincerely yours,
Mrs. Tyna Cox
Washington, N. C.

Dear Sir:

I am and have been a subscriber to WILDLIFE for some time.

Could you publish this note in Crackshots & Backlashes to correct a wrong impression written by a George P. Carr of Wilson "against trapping?"

Quote, "Trapping does more harm than polluting of our streams and air." This in itself is silly; anyone, quote "can plant steel traps around the countryside *without a license.*" This is false.

There is a *season for trapping* as well as for hunting and the person who sets traps on anyone's property without *getting permission from the owner* is breaking the law. The man for Mr. George Carr to complain to is his wildlife protector and not start a lot of propaganda in our good magazine.

I contend that legal trapping *is a sport.*

Since retiring from teaching at the age of 65, I have got quite a bit of outdoor recreation—not "kicks," out of trapping muskrats out of the ponds of many of my friends in Orange and Durham counties.

Those "toys found selling like confetti" cost around $20 a dozen. The "Conibear" killer type trap kills in an instant and ends the life of a very undesirable pest along streams and in farm ponds.

The price of a "well cared for" prime muskrat pelt averaged $2.25 last year. This is about double the price of furs during the past several years.

Again, reminiscing, the first "rat" I caught as a boy of 12 gave me as much of a thrill as the first deer or the first 8-pound bass. I get a hunting and fishing license in North Carolina free. The price of my trapping license every year is $4.50.

Sincerely,
William H. May
Durham

Dear Sir:

We read the article or column by George P. Carr on anti-trapping and steel traps. We see by his comments he has no ideas or factual information on trapping and its relation with hunters and sportsmen. I have enclosed some facts that deal directly with trapping (Brochure of Fur Takers of America, International). How would he solve these problems since he suddenly became an expert on trapping and wildlife?

Sincerely,
Wally Schmeg
Fur Takers of America, Inc.

Dear Sir:

I have just finished reading a letter in your June issue by a man who claims to be a true sportsman. If he were a true sportsman he would know that trapping does not do anywhere near the damage pollution does. This man also states that trapping is not his idea of a humane sport. Most people set their traps so that the animal is drowned right away. In regard to the statement that traps are being

sold like hot confetti, I guess he didn't know that fewer traps are being sold each year because of less trappers. Mr. Carr, you don't get rich off trapping and neither does the people that sell them for a living but it's an old American pastime and a job that is in the great outdoors. Back in the 1800's and early 1900's there were a whole lot more trappers then than today. So how in the world are the few trappers there are now going to kill more animals than pollution? He speaks of anybody who wants to can go and buy as many traps as he wants and set them without having to obtain a license. Well, if he's the sportsman he says he is, why doesn't he read his hunting and trapping regulations? Then he would know that in North Carolina you certainly do have to obtain a license. I know that there are people that use traps carelessly but these people are few and far between. But we also have these kind of people in other outdoor sports too. There are those who catch or kill all they can get and end up throwing the meat the good Lord gave them away. I am 14 years old and an avid outdoorsman. But I think I am old enough to know that people should know the truth.

Sincerely yours,
Charles E. Prevette
Statesville

Dear Sir:

I would like to take this opportunity to comment on your magazine and express my thoughts on a particular letter which appeared in your June issue.

On the whole you have one of the finest magazines on the market today. I am one of the silent majority speaking up. I am aware of the fact that you can not please all the people, but I feel I have been greatly wronged. And I feel it is my duty to write and inform the people of *all* the facts.

In your column there appeared a letter from a Mr. George P. Carr, in this letter there appeared, and I quote, "Anybody who has the inkling can go and buy himself as many of these traps as he wants and plant them around the country side without having to obtain a license." Nothing could be further from the truth, last year I paid $4.25 for a state resident trapping license. In addition to this the same trespass law applies to trapping as hunting and is printed on the back of both licenses.

To top things off right if Mr. Carr wants legislation to "preserve what little wildlife there is left", why don't we have laws passed to halt the sale of cars on the open market? After all they take more game annually than traps.

Sincerely,
Randy D. Feagle
Beaufort

Andy Mitchell is the son of Mr. and Mrs. C. B. Mitchell of the Rosewood Community near Goldsboro. This is his essay on his responsibility as a safe hunter, written as part of hunter safety course for a Boy Scout merit badge. We can all learn from it.

HUNTING can be a safe and fun sport, but the responsibility is yours, the shooter. The handling of a gun takes a thoughful, sportsmanlike attitude as well as knowledge of gun safety. If you are not a safe hunter, the blame is on you!!!

Each year millions of hunting accidents happen. You can help by taking safety courses such as the Hunter Safety Course of North Carolina and probably many more. These hunter safety courses are designed to help make every day association with safe gun handling. Most accidents happen because the hunter is not using his brain. If you will just use your common sense, you will come out of the hunt the way you went in the hunt.

As my responsibility as a shooter or a hunter I would do the following: Go hunting with an inexperienced shooter. Take him and talk with him about all safety when hunting and shooting, show him all safety parts of a gun, discuss with him the proper gun cleaning, show him all safety precautions, take him to the land you will be hunting (with the owner's permission) and get him familiar with the place.

So you can see safety is a "must" in shooting and hunting.

Andy Mitchell, Age 12

• FROGS

Continued from page 22

side orders are cooking, wash the legs well in cold water, remove the sciatic nerve which is a black sinew running the length of each leg. This keeps the legs from jumping in the pan. Flour the legs and preheat your oil, again, as you would do for fried chicken. When the other foods are finished, put the legs in the hot oil and cook for 5 to 7 minutes. Watch them closely. If they are over cooked, they will toughen. When done, remove them and drain on paper. Serve piping hot!

If you're wondering what frog tastes like, it reminds me of a combination of very tender, young chicken, and fresh shrimp, deep fat fried. Keep in mind serving it hot though. It isn't good cold!

After I eat a big frog leg supper, I always like to go out and sit in the yard. Somehow, when it gets quiet, I seem to hear the deep, straining, crack of the big bulls. Some of these giant frogs measure 10 and 12 inches from tip of nose to end of toes. What a sport! Try it and see if you don't enjoy this fine night sport. It's a great way to spend a Friday night! ◆

Bring the great outdoors to town on National Hunting & Fishing Day September 22, 1973

The first National Hunting & Fishing Day, September 23, 1972 saw some 4 million people visiting Open Houses hosted by over 3,000 sportsmen's clubs throughout the country..

With your help, NHF Day this year can be far bigger, can introduce millions more of the public to the conservation achievements of America's 55 million hunters and fishermen.

One great way to improve on last year's achievement is to take NHF Day into town. That's what many clubs did last year, especially those without their own club grounds, and the results were outstanding. People who might have overlooked a program at a rod and gun club in the country flocked by the thousands to programs staged at shopping centers, town squares and athletic fields.

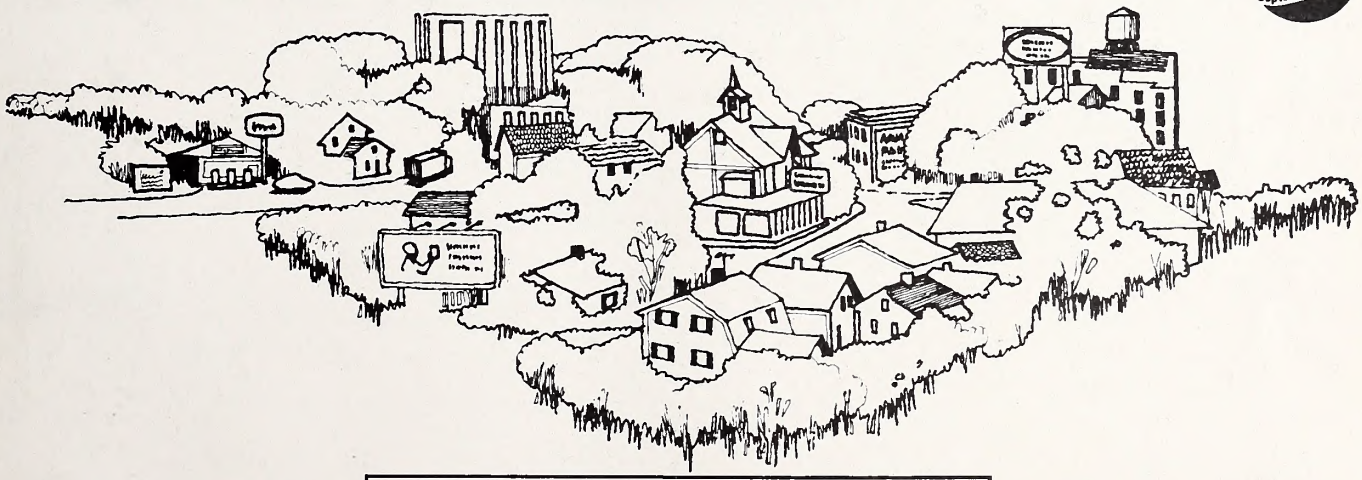
So don't be held back if your club has no facilities of its own for holding a gala NHF Day event. Start planning now to hold one in town.

Send for the new, revised National Hunting and Fishing Day Action Manual. Bulging with knowledge gained from last year's 3,000 celebrations, this new manual gives you complete "how, where and what" information on organizing, promoting and conducting a successful NHF Day celebration. It answers every question.

You can also order a special NHF Day Aids Kit containing everything you'll need to advertise and dress up your event in red, white and blue: streamers, signs, banners, posters, bumper stickers, plus publicity announcements that your local newspaper, radio or TV station will want to use.

Please order today. Making NHF Day happen in your town is up to you.

NATIONAL HUNTING & FISHING DAY
September 22, 1973



TO: **NHF DAY**
1075 Post Road, Riverside, Connecticut 06878

Please send_____copies of the NHF Day Action Manual @ $2.00 per copy.

Please also send_____NHF Day Aids Kits @ $3.00 per kit.

I enclose $_____to cover the cost of my order.

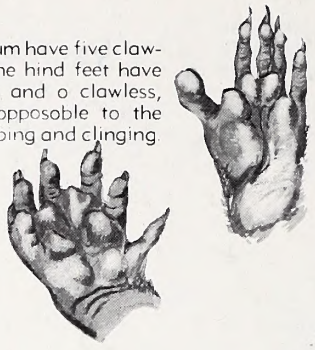
Name_____

Organization_____

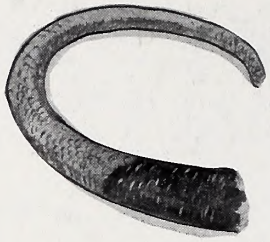
Address_____

City_____State_____Zip_____

The front feet of the opossum have five claw-beoring toes (left) while the hind feet have four claw-bearing toes and o clawless, thumblike toe which is opposoble to the others and is used for climbing and clinging.



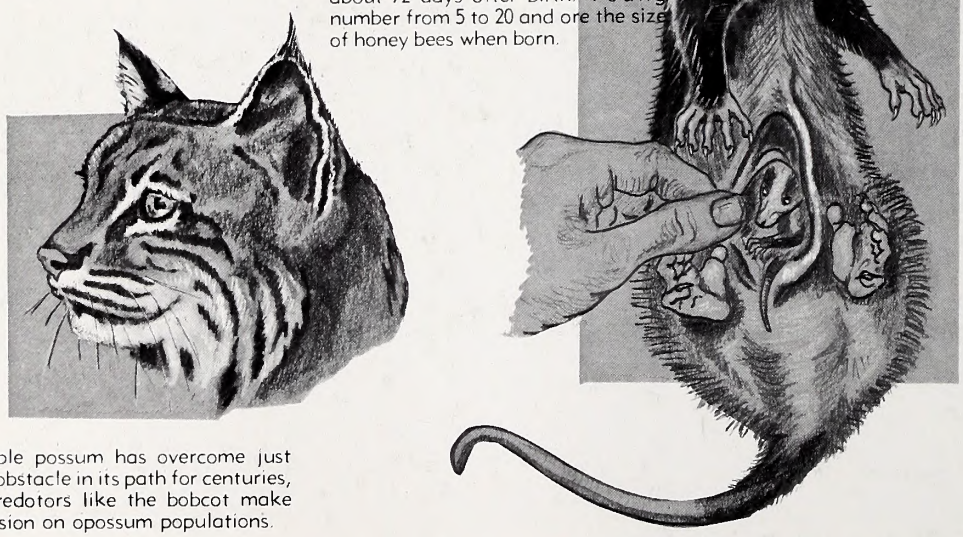
The tail is fully prehensile and strong enough to support the possum in mony honging positions without the aid of the feet. It is also used to carry objects.



OPOSSUM

Individual opossums vory considerobly in size, with a maximum weight of around 15 pounds. It is the only living mammol with 50 teeth (when full grown). Color of the possum ranges from a light groy to almost block.

America's only morsupiol carries its young in an obdominol pouch for about 72 days ofter birth. Young number from 5 to 20 and ore the size of honey bees when born.



The odaptable possum has overcome just about every obstacle in its path for centuries, ond even predotors like the bobcot make little impression on opossum populations.

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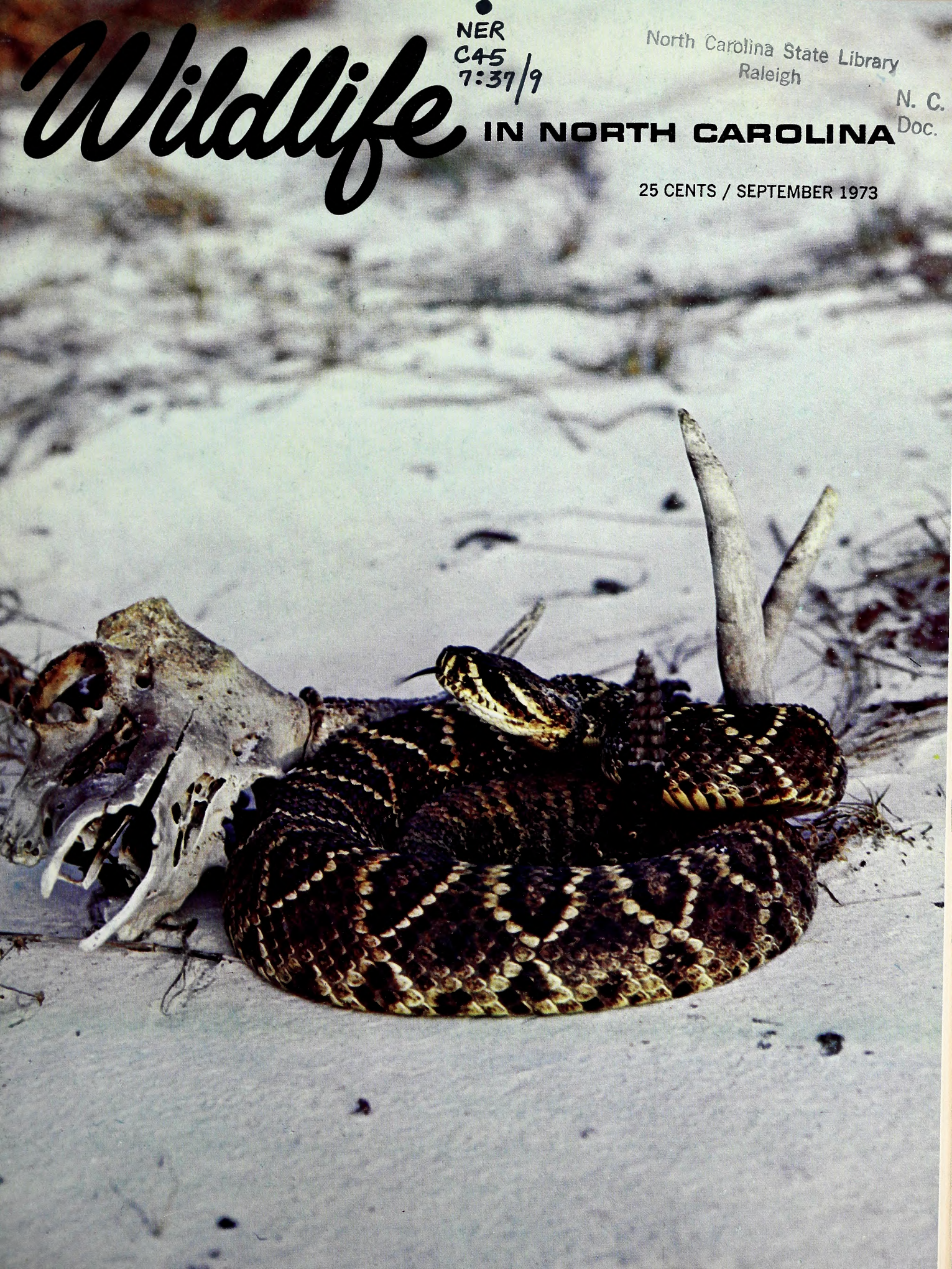
Wildlife IN NORTH CAROLINA

25 CENTS / SEPTEMBER 1973



LAZY RIVER

September often puts new life into old fishing waters. A few cool nights, and the fisherman renews his hope in all those fish that were on summer vacation.

PHOTO BY ROBERT T. PUCKETT

STATE OF NORTH CAROLINA

JAMES E. HOLSHOUSER
GOVERNOR

DEPARTMENT OF
NATURAL AND ECONOMIC RESOURCES
JAMES E. HARRINGTON, JR.
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AND WATER SAFETY

WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

* * *

WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage except APO and U.S. possessions. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 100,670

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 9 SEPTEMBER, 1973

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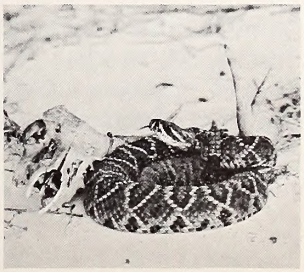
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



The warm sands of a pine woods opening will appeal to this diamondback until midday temperatures drive him back to cover. Snakes are "cold blooded:" that is, they take on the temperature of their surroundings and can't regulate their body temperature as can mammals and birds. Photo by Jack Dermid

TEXASGULF — Six Years Later

Part 1

By Charlotte Hilton Green
Raleigh
Photos by Texasgulf

The author surveys a flock of whistling swans that selected this spot on the Pamlico River, very near the Texasgulf plant.

IN June, 1967, this magazine had a long article *OUR CHANGING ENVIRONMENT "Some Reflections on the Dark Side of Progress,"* in which nearly four pages were devoted to a discussion—largely critical of *TEXAS GULF SULPHUR* (now *TEXASGULF, INC.*) which, at that time, had recently been established on some large acreage, on Lee Creek, Beaufort County, North Carolina.

There had been general unfavorable reaction to the phosphate plant in Florida (this was *not* a Texasgulf operation)—which had severely damaged livestock and citrous industries within several miles of the plant. Too, at the time this 1967 article was written, North Carolina was weak on air pollution laws. Also, it was strongly felt the state had great need for improved control of water usage, stating: "The ground water of the Coastal Plain of North Carolina is a resource of untold value."

TEXASGULF owns or leases 30,000 acres of this land around Lee Creek, which is underlain with phosphate—the phosphate needed in the fertilizers so necessary to feed a hungry world.

Just what is *TEXASGULF, INC?* (*TG* from here on.) and its story in North Carolina? Quoting H. V. Donoho, Senior Vice-president Agricultural Division, *TG.*, Raleigh, N. C.; "In 1964 *TG* began to produce agricultural fertilizer materials from phosphate deposits in Eastern North Carolina. Today our Lee Creek operation is one of the world's largest producers of fertilizer materials."

And just what is phosphate? Let's take a trip back into time—about 15 million years ago—and try to visualize what our Eastern Carolina looked like then? The sea—the great, wide, beautiful sea! Those coastal waters extending far inland—once upon a time even within a few miles of Raleigh—contained vast amounts of phosphate. Aeons upon aeons of time passed and this phosphate, combined with skeletons of tiny marine organisms, settled to the ocean floor. Millions of tons of it!

In later millenia thick layers of sand covered the phosphate, and the sea receded. Thus one of the world's largest phosphate reserves remained hidden from view. But how the world—a hungry world—needed fertilizers! And phosphate is an important part of them.

(Dr. J. Fulton Lutz, soil scientist at N. C. State University, predicts: "Crop production in the state would drop 50% this year without the use of chemical fertilizers.")*

Borings were made by *TG* on the low flat lands by the Pamlico River . . . metallurgical tests of core samples were made in the Minerals Research Laboratories at North Carolina State University, at Raleigh. (*NCSU* from here on.)

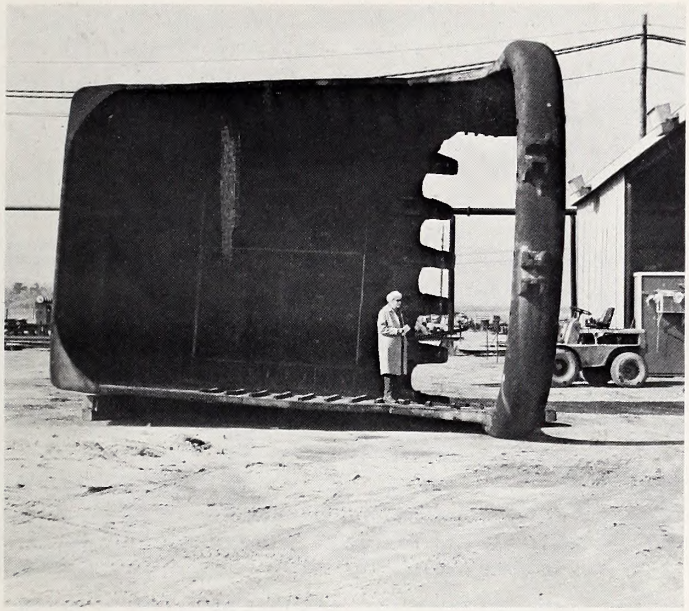
And the findings of those borings? "That at least 50,000 acres in extent were rich enough for decades, or even hundreds, of years of mining. At present only 100 acres are mined a year. But what those 100 acres produce! Some three million tons of ore are mined from a depth of from 90 to 130 feet."

Does It Work?

And *TG* claims it is trying to do it with the least possible damage—and the most "restoring the land to nature" possible for the area. Is it succeeding?

From the beginning *TG* has drawn on *NCSU* for various advice, experiments, research. In cooperation with *NCSU,* state and federal agencies, it monitors the air around the plant on a continuous basis. In fact, the Pamlico Marine Laboratory of *NCSU* was established in 1964 with funds donated

* The UNIVERSITY and The ENVIRONMENT *NCSU*



The immensity of the 72-cubic yard dragline bucket sets the mood for much of the vast operation of mining the phosphate here. Most everything about the plant is on a large scale.

Dr. W. W. Woodhouse, professor of Soil Sciences, N. C. S. U. (left) and Brooks Whitehurst, Texasgulf's technical services superintendent, examine grass planted on reclaimed land.

by *TG* . . . . its activities devoted to the basic ecology of not only *TG,* but of the estuaries of Eastern Carolina.

In the beginning, too, there was need for improved control of water usage, and there were, and are, problems and apprehension regarding the company's dry pit mining technique. Some of the fear, and criticism of *TG* was over what would happen to the water table, to the air, how the mined land would be left. (More about this, later.)

"Perhaps," I've been told by some of the scientists, "one of *TG's* mistakes in the beginning was not making clear their plans for restoration, of 'returning the land to nature.' Or, perhaps they did not fully understand themselves—but have since learned, and worked cooperatively with *NCSU.*"

Early in 1972 the N.C. Board of Water and Air Resources issued a 20-year water-use permit—renewable at five-year periods. Said permit followed an extensive study and report by state authorities. And, at any time this state agency feels *TG* is doing anything wrong, it has authority to stop it.

Perhaps here I should state my own connection with *TG.* As a columnist (Sunday *News and Observer*) and long-time writer of *OUT-OF-DOORS,* of conservation (of human, as well as natural resources), birds, wildlife, soils, forestry and such, I had been asked by *TG* to go down to its area, go over the place, meet the executives, the heads of various divisions—discuss its labor relations, race question, problems, school, meet the people, hear any criticisms (and hopefully, favorable comments) and such. In general, to try to present a picture of the place "six years later." And what *TG* is trying to do regarding being a constructive part of the communty—its extra activities, as cattle breeding and forestry, to "restore the land" after the phosphate has been removed.

A series of four long columns ran in the paper.

Now, as I've queried numerous professors of *NCSU* who have worked on, or have been consulted regarding *TG's* various problems and projects—as besides water, soils, grasses, pasturage, trees, cattle, forestry, labor situation, effects on the land, the general opinion seems to be that *"TG* is working hard to do a good job and to live up to its claim: 'Help keep North Carolin clean, green and prosperous.' "

Still, many of the scientists are yet apprehensive. One criticism (of my columns, which I had asked for): "My principal comment is that some might have interpreted them as painting too rosy a view in that they appeared to present only the industrial side of the story. No development occurs without costs and these should be laid out right along with the benefits. The ground water problem is particularly complex and a great deal more data are needed to predict long-term effects. Then there is the question as to what happens when additional new development with its own water demands enters the picture. Should one industry be permitted to pre-empt the ground water resources of that region? This will require new assessments by the State and probably new allocations of the available supply—which, in turn, may mean changes for *TG* in its present practices . ." Dr. David H. Howells, Director *UNC* Water Resources Research Institute.

Another report, from Dr. Howells, re the Study of Fluoride Uptake by Oysters, in the Pamlico River. "Present populations of oysters from the Pamlico River . . . at this time no danger to oysters or humans from the fluorides from phosphate mining wastes . . . However, fluoride levels should be routinely monitored."

Knowing the age of the pines and other trees on the area will help Texasgulf's foresters plan for land uses. Many environmental changes are necessary for optimum plant operation, but reclaiming "used" land is an important aspect of the firm's policy.

Pasture grasses are established on areas which will be mined, and then land that has been mined is carefully turned into grazing areas for beef cattle. Although wildlife itself benefits only indirectly, the total area environment is important to Texasgulf.

From Harry M. Peck, Chief, Ground Water Division, Department of Natural and Economic Resources, comes this on the ground water conditions in the Beaufort county region, June, 1973.

"There appears to have been little change in ground water conditions in the Beaufort County region during the past year or two. No significant new withdrawals have begun and withdrawals by Texasgulf have been relatively stable, therefore water levels for the Castle Hayne aquifer have also been relatively stable. Periodic sampling and analysis of chloride content of water from key monitor wells show some minor fluctuations in salinity, but have not shown significant increase in any wells outside the immediate vicinity of the phosphate mine."

Mining Operation

And now let's get back to the mining of the phosphate. The decision had been to use two large draglines in an open mine pit. (There has been criticism of that, also.) It is a fascinating process to watch. On that early February day, we were a little distance away—scuffling through some of the "overburden"—fine white sand, greenish silt and scattered fossils—now and then stooping to pick up fossils, including sharks' teeth—(think of it—teeth millions of years old!). We had already walked over some of the "restored land" now planted to grass.

The two giant electric draglines work together to mine the ore. The larger one (largest in the industry) is a 4,548-ton machine with a bucket capacity of 72 cubic yards (cost $6,150,000.). Its companion dragline has a 19 cubic yard bucket. This one goes first, removes the top cover of 15 feet of beach sand and 15 feet of shell, sand and clay. Then, with 100-ton bites the 72 yard dragline strips the remaining feet of overburden to uncover the ore.

In the next bite it stockpiles the phosphate at a sump pit, where the ore is then slurried with water and pumped to the mill. The slurry of water and phosphate ore is pumped a mile-and-a-half through 15-inch pipe-lines to *TG's* processing plants.

Of course, it makes some noise, but it's not particularly disturbing. The slow movement of the giant machines is rather mesmerizing—like watching something in a Never-Never Land . . . is it really moving? And, almost impossible to believe, looking away from the machines, in another direction, we saw some 500 white whistling swans floating, seemingly with no cares, on the blue waters of the Pamlico River. (This was winter time. The swans would not be there in summer, but probably in the Arctic busy with family cares. Let's hope they will return!)

A white paper is given visitors, explaining briefly the story of phosphates: the mining, scrubbing, screening of ore concentrates, ready for shipment. *TG* is ideally situated to serve both domestic and international phosphate and fertilizer material markets. Rail shipments leave the mine on a 32-mile spur line built by Norfolk-Southern Railway. Trucks easily connect with major highways. Self-loading barges of 2,680 tons capacity carry *TG's* phosphate and fertilizer over the intracoastal waterway to deep water ports in Morehead City, N. C. and Norfolk, Va.

World Needs

Is fertilizer needed? Much of the world is hungry, large areas of it near starvation. In a *UN* report, James Boyd (*The PILOT,* Jan. 31, 1973): "There seems to be a world shortage of fertilizers. Hunger in India and Bangladesh are dependent on fertilizer re growing new varieties of rice and grain. Recent earthquakes have destroyed much in Man-

agua, Nicaragua, with 10,000 killed, 30,000 injured, 300,000 homeless—and hungry. And more recent floods—even as this is being written, in early July —have added danger of more floods, spoiled harvests, delayed later plantings. Nearly every paper and magazine brings word of more hunger. But—is it OUR responsibility?

Two comments, from two fine men I know: "We've got to have fertilizer, but we need *zero population* growth here, and abroad." And, "Feed the starving millions? . . . what gain, just to live and produce more starving beings?"

Referring again to Dr. J. Fulton Lutz *NCSU*: "We must learn to live with fertilizer or starve . . . NC farmers never made more than 20 bushels of corn per acre prior to 1942. With aid of more nitrogen and other fertilizers, the 1972 yield was about 80 bushels per acre." *The University and the Environment" p. 26.

Cattle — Before and After

A few miles from the mine site, beef and brood cattle are grazing on land that will some day be mined. AND—when that time comes, cattle will be grazing on acreage that *has been mined*—the land restored, planted to grass—and contented cattle grazing. (By this Fall around 100 acres of it should be ready for grazing.) There you are—a Before and After Tale.

And fact, not fiction.

When *TG* first began operations, the company asked *NCSU* to help them on the best use of the land "both before and after mining." Conditions specified: "That there be no competition with business in Beaufort or the surrounding counties, where tobacco, vegetables and feed crops are grown on small farms in the area."

How many studies had been made, both at the plant and the University and the region—concerns over water, air, pollution, soil, forestry, livestock, ecology in general! With men like Dr. W. W. Woodhouse, Soil Department; Dr. B. J. Copeland, effects on estuarine ecology; Dr. Gerald Elkan, served on Air and Water Advisory Board; Dr. Ray Noggle and Dr. Art Cooper, Botany Department, projects supported by *TG* in the early stages; Harry Peek, Office of Water and Air Resources; Dr. Guy Jones, Agronomy Extension . . . and others.

After a thorough study, consulting *NCSU* and the N.C. Cattlemen's Association, a beef-cattle ranch and forestry program were proposed, and both put into action, with Hayes Gregory, formerly of *NCSU*, in charge of Pamlico Farms, South. (Talking with Dr. Jones, re Mr. Gregory, he commented: "His outstanding research, plus practical experience—he taught animal science for ten years—makes him a successful operator.")

On our visit we had long discussions with David Edmiston, General Manager of *TG* at the plant; with Wilton Smith, Supervisor of Public Relations, who squired us around, explaining much as we tramped or rode—and an entire afternoon with Hayes Gregory, fascinated with his discussions of cattle breeding and forestry. (Yes, the two can be connected!)

Now, with a staff of thirteen, Hayes Gregory has created a farm that draws visitors from nearly every state in the union. *TG*, starting with an original all-Angus breed, experiments proved cross-breeding better, including Hereford, Limousin, and Simmental. As of now, Angus-Hereford appears most practical. Hereford, an English hardy red beef cattle, with white face and markings, is now extensively raised in our western states. As a basis, in our climate, Angus-Hereford is probably No. 1, best for beef, takes care of calves and maintenance cost for cows is a little smaller. Always the Angus is used for the cow.

All cattle are numbered, by freeze method rather than branding with hot iron. Coastal Bermuda grass the best for grazing; wheat and rye planted, not for harvesting, but for grazing during fall and winter months. In winter, silage and hay are also fed. Cattle are outdoors all the time, except during any sickness—thus buildings not necessary, though windbreaks important.

"*TG* currently has 120 acres reclaimed land seeded to coastal Bermuda, fescue, and millet; plans to have some cattle grazing on this reclaimed, forage-seeded land by early Fall. The seeding of Bermuda, fescue, and millet constitutes a test to see which produces best on the reclaimed land."

At present the beef operation currently involves 1,823 animals. By 1975 it plans to have 1,800 acres under cultivation, with 3,500 to 4,000 brood cows; to continue cattle and pasture experimentation with objective to help others wishing to raise cattle in Eastern North Carolina.

Previously, at the right time the cattle had been shipped for "finishing"—a period of corn feeding—to midwestern corn states, or Texas. ("That seems expensive," I had interrupted, but was told, "It's cheaper than shipping the vast amount of corn needed here.")

BUT—recently—with the great meat shortage and price rise—buyers have been coming to the *TG* farm, which recently had a large auction! With buyers from eight states making bids!

(concluded next month)

Dogs Decoys and Doves

By Frank Mooney
Photos by the Author

THIS great upland gamebird is becoming more popular every year, and with good reason. More posted land, more land becoming concrete jungles, with pollution taking its toll, plus more hunters in the field. No wonder this gray streak has been voted the number 1 bird by many. Its agile flight, and its ability to bounce back strong even under heavy hunting pressure, helps keep this wonder bird in great demand. When a gray target soars over a field throttled down to 30 miles per hour, and after a fusillade of shots, turns on the afterburner and streaks through the pellets at 60, it leaves plenty of air space to miss your target.

Several years ago, while the Department of Interior was having the experimental 18 per day bag limit on doves, a friend and I went to a corn field that had been recently picked by a mechanical corn picker. Doves were plentiful, but with the high wind, high flying birds, and most birds flying over the small strip of woods that separated two fields, my shooting was well below par. My friend had found two large walnut trees standing in one of the fields, and shot doves as they lowered the flaps for a landing. After his 18 bird limit, he told me with a big smile on his face, that he had finally caught on to the secret of wing-shooting. He was a novice at dove shooting, so I figured talk would not make much of an impression on him.

Sometime later, I happened to ask him about his dove shooting. With much less bragging, he told me about his *next* dove shoot. He could not find a tree that birds were using to look the field over before flying down to feed. So he had to shoot (or shoot at) the birds going at full throttle. He told me that his first box of shells had not downed a bird, that he had made the feathers fly, but the feathers went along with the meat. He still couldn't understand how much lead you had to give a dove, especially with a strong tail wind and going full out.

This article is for the young hunter, the novice or anyone that feels like their gamebag is too light at the end of the day. Dogs can and do add a lot of birds to the larder for me, plus the enjoyment of watching a retriever sally forth after a winged bird. One season I crippled a dove, and sent my yellow lab after it. The bird was badly hit, but managed to fly about shoulder high. The lab was running full tilt under the bird, trying to snatch it from the air. The bird flew almost 60 yards before the dog could ever take it. The hot weather saps the dog's energy and one doesn't sail out of the blind like duck hunting on an ice-capped lake, but the excitement is still there.

There are other breeds of dogs (besides the retriever class) that will "fetch" a downed bird for you on command. A friend of mine had an English setter that could also be used as a non-slip retriever in the dove field. Cocker and springer spaniels, German wire-hair pointers can also be used when trained in this way. One of the most enjoyable reasons for using a retriever on doves, is that I can try for a double when several birds come over at one time, and not worry about marking the first bird down. That extra set of eyes on your side, makes for relaxed shooting. This is also good experience for the retriever before duck season. It keeps him in shape, refreshes his obiedence and helps to keep his marking ability honed to a fine edge.

Any experienced dove hunter knows the frustration of looking for a cripple when other birds are streaking overhead. When the shooting is slow, often the birds fly erratically, and one can miss several chances in a short span. Many doves wait in nearby trees where they can overlook the feeding area, and fly when they see other birds winging their way into the field. Often a bird some distance away mistakes a dead bird falling as one dropping into the field to feed. Doves have fantastic eyes, and can identify their kin several hundred yards away.

About that time you struggle out with two boxes of shells kneading you in the side, and your gun unloaded. In the haste, you reach into the wrong pocket where your empties are, (saving the empties to reload) as several doves almost knock your hat off as they flair from your path. Frantically you get the thunderstick loaded as they get beyond gun-range. Sound familiar?

Decoys are not used much, even by the experienced dove hunter, but can be a powerful magnet to pull the birds into shooting range. Doves usually have a preferred feeding place in a large field, and most birds use it together. However, a bird that soars over the feeding area and cannot find any of his kinfolk already feeding will often fly to the opposite end of the field if any birds are perched in the treetops. As many different species of birds have found to be true, there's safety in numbers, and doves are no exception and follow this rule more than most. This is where the facsimiles when placed properly can be their undoing. Two or three decoys placed in the top of (or as near as possible) a bare, or dead tree which birds normally use, will quickly catch the eye of an incoming dove and by the time he realizes the mistake, it is too late.

Often it is impossible to place the decoys where they will do the most good, due to tall trees with no limbs to climb, etc. An old telephone wire, (not being used) a barb-wire fence, or even a small tree can have an arrangement of decoys on it. Often a small bush or tree near a watering hole will help to dupe the less wary. Most birds cannot resist a well-placed set of decoys after failing to find birds feeding on the ground. Some days, when birds are not flying much, or have left for less-crowded fields, several well-placed decoys can mean the difference between success and failure.

Decoys can be a big help on days when other hunters are absent, and there's nobody to help keep the birds flying. I have to work most weekends when the majority of the hunters are afield, so I have to turn to other schemes when I go at it alone. A good friend of mine, Raymond Hobgood, often accompanies me when our days off are the same. We enjoy some friendly competition, and when I outshoot him, he claims that it's only because I have my yellow lab, Peanutbutter Pat, to find some cripples that other hunters miss. At times the oral fire is almost as loud as the center fire.

Placing dead birds on the ground as if they are feeding can also draw other birds in. Propping up their heads with a small forked stick or clods of dirt can make the birds look almost alive. On some occasions, I have had high flying birds circle back for a landing, when using this method. It's a little added thrill when I pull those high flyers down to gun range. Its much like "conning" a flock of puddlers into your well-placed stool of wooden blocks.

For the young hunter or novice, a dove braking-in for a landing can be a great aid in starting him on the way to becoming a good wing-shot. It's hard

Silhouette and full form decoys both have their place in dove hunting. A half dozen can often work wonders with cautious birds. Put them where you think the doves will see them best. Results (below) can be gratifying.

for many novice hunters to comprehend the lead necessary for a dove clipping along at 60 miles per hour. Dove hunting is also great to help close the generation gap with your son. I can still see the gleam in my 11 year old son's eyes when he shot his first dove. Bret was too young to take hunting with a crowd, so one day after school we went to a field near home that had a large oak standing along the north side, and was a favorite landing site for would-be-feeders. After placing him there, and saying once again not to forget the safety rules, I moved a short distance away with my lab.

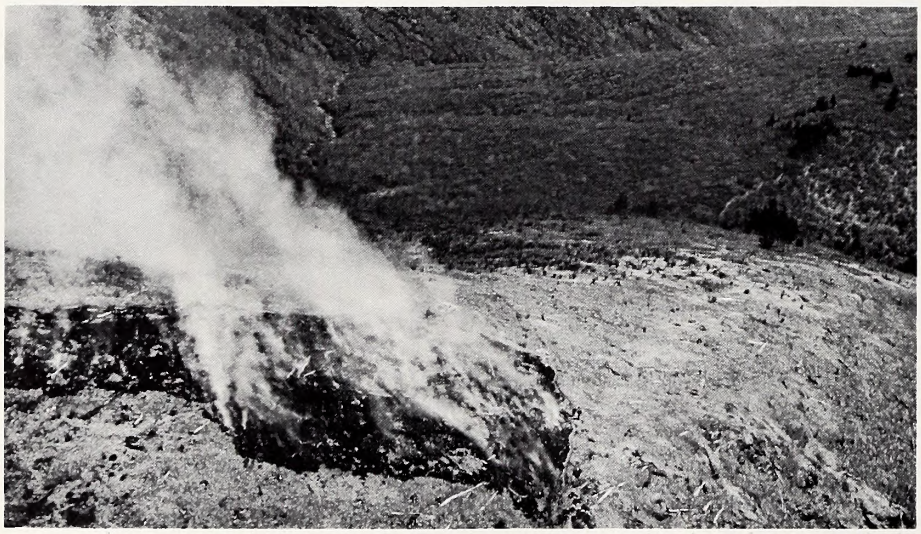
After grassing three or four doves, and Pat making the retrieve, I noticed that Bret had still not scored. Once his shot pattern had cut some tail feathers, but the bird was unscathed. The wind was blowing in strong gusts, and I knew from experience that many hunters' averages fall low on days like this. I nailed a high flyer that was pushed along by a strong tail wind, and went some distance before cartwheeling into some tall grass. The lab marked it well, but due to the high grass had to make several courses before delivering to hand. It seems a fatally hit dove will aim for a clump of grass before giving up the ghost.

• **continued on page 27**

Help For the Golden Eagle

C. G. Hughes
Hickory
Photos by the Author

Prescribed or controlled burning has a place in forest and wildlife management. Not all species benefit from each operation, but in this case, the 105-acre tract should attract golden eagles again.



The U. S. Forest Service burned a 105 acre slope on Black Balsam Knob in the Graveyard section of Haywood County for the benefit of the golden eagle last May.

Logging and two disastrous fires that swept the area in 1926 and again in 1942 created an artifical bald and gave the area its name "Graveyard Fields." Golden eagles found it to be suitable feeding habitat in their winter visits, but in recent years heavy growth of fire cherry, birch and rhododendron began closing the area to the large birds.

Bill Zeedyke, U.S. Forest Service biologist, says the golden eagles are frequently sighted during their spring and fall migrations across the mountains.

The eagles feed over such a wide territory that it is difficult to estimate the number of birds using the area. Some observers, admitting wishful thinking, believe that a few of the eagles may nest in the wild and rugged Shining Rock Wilderness Area. To date, no active nests have been discovered.

Controlled burning destroys young weed-trees, rhododendron and restores the open spaces necessary for the large birds (6-7 foot wingspan) to land and feed upon rabbits and rodents.

Much of this area was covered with old-growth huckleberry bushes. Fire regenerates the berry fields by destroying the old woody growth and encourages new sprouting for an increased yield of berries for bear, deer and grouse.

The Forest Service received a special appropriation last fall to burn and preserve the habitat for the golden eagles, now considered a rare and endangered species, but the project was delayed by the extremely wet winter.

The experimental controlled-burn was carried out without a hitch. Dan Hile, forest ranger for the Pisgah District, directed the action of the 75-man team by two-way radio from a ground station and a helicopter. Two spotter planes from the State and National Forests monitored the area throughout the burn. A special team of firefighters attached to the helicopter was on standby throughout the day.

Personnel from the N. C. Forest Service and the Wildlife Resources Commission cooperated with the U. S. Forest Service in the experimental habitat restoration.

Future observations and study will be made of the area to determine the extent controlled-burns can be used to preserve or enhance wildlife habitat in the mountains.

Controlled burning has been used extensively in the flatland forests of the Southeast, but has been considered to be too hazardous in the mountain forests.

Many foresters believe that controlled burning not only improves the habitat for most wildlife, but it also reduces the litter buildup and insures against destructive wildfires in remote sections of the mountains.

LION!

by Tom Shelton
Wilmington

I was in Canada, Moose hunting, and missed the first four weeks of deer season at our Pender County "Northeast Hunting Club". So, wanting to get back in the friendly competition for a nice buck, I decided to "still-hunt" one afternoon on one of our "approved areas". (We are primarily a dog-hunt type club but do have certain sections where we still-hunt.)

This particular afternoon, one of those beautiful, softly lazy, nice golden-tinted times when you can hear a squirrel drop a hickory nut a city block away, I was quietly perched in a tall pine about 40 feet up, overlooking a large, white sandy-floored, blackjack oak and pine tree sprinkled ridge, or "island" as locally known.

With only about ten minutes remaining of legal shooting time, I had been carefully observing with binoculars and scope, a spike buck following two does, playing, nuzzling the leaves and feeding on the fallen acorns. Inasmuch as we do not shoot any deer less than a forkhorn (4 point) while still-hunting, I had kept very still for a long time just hoping that a shootable buck would move in and contest the small buck for the does. My legs were beginning to cramp and I had decided to shift position, spook the deer and restore circulation and climb down, trying again another day and time.

As I started to move, suddenly, the quiet was shattered by a loud crashing and thrashing noise apparently coming from the upper end, my right side, of the clearing. A deer bleated loudly, then into the open, bursting out of the gallberries, appeared three deer, closely pursued by what seemed to me to be a very large collie or shepherd dog. All three deer ran bunched up, angling diagnoally across the ridge in my general direction.

I switched position, quickly using my already-focused binoculars to check for a buck but could not find any horns; three does apparently. One large and two medium sized, all jockeying to get ahead, jumping high and running flat-out. About this time, the pursuer, which I continued to consider to be a dog, crossed a wide, clear, white sandy, open area, in plain view, and suddenly, I was looking less than 100 yards away—at a long tailed LION, AND A BIG ONE.

Clear daylight, sun shining, 7 power wide angle binoculars and me sitting down,—cold sober—.

As the group crossed the spine of the ridge, the large doe split off toward me, made about 10-15 long jumps and stopped behind some low gallberry bushes almost under me, watching the action. The LION seemed to have its mind on just one of the does (I think that I saw some blood on one flank), and the three vanished into thicker bushes. I could clearly hear the commotion in the leaves and brush and also determine the location of the chase by watching the big doe's head below me turn and move.

Suddenly, again one deer burst out into the open with the LION about 20-30 feet behind, making fast, short jumps and partly running like a dog or horse, the deer high jumping, covering about 12-15 feet each jump. (I measured all tracks, afterward.) Then the doe abruptly reversed direction, the pursuing LION attempted to follow but slewed around, its forepaws holding but hindquarters sliding and skidding in almost a half circle, leaving deep clawmarks, for about three feet. The doe thus gained another two or three jumps placing her an additional distance ahead; the lion recovered its balance and away they both went, again, into the heavy brush.

The crashing and thumping quickly faded away. All this time the big doe under me stood stock-still, ears swiveling, head moving, otherwise just like a statue.

Quiet returned. After recovering my breath and equilibrium, also sitting still for about ten minutes to see if anything further would happen, I noted that the doe slowly drifted away down the ridge in the opposite direction and finally out of sight.

Then, I climbed down, stretched my legs, examined the tracks, marveled at what I had witnessed, knowing now, WITHOUT QUESTION, we HAVE . . LION, COUGAR, CATAMOUNT, or whatever you may term or call them, in our area (Pender County).

Yes, at the time, I was so stunned, shocked and fascinated by what I had witnessed, that I doubt that I could have zeroed in with my 'scoped rifle on the LION.

This in event that I had wanted to shoot the animal. However, at one time it was within less than 100 steps of my tree stand, slowed up by its skidding, plainly vulnerable and in the open.

Also, apparently this same animal was jumped and flushed by our deer dogs, spooked into clear view beside a roadway, and observed, clearly, at short range, (almost shot) by our Hunting Club President, Mr. Hubert M. Sanderson, in clear broad daylight, the same week, same area. ⬍⬍

Our National Refuge System in Trouble

NATIONAL Parks and Conservation Association (NPCA) recently has found that a major cutback in operation and management of the national wildlife refuges will take effect July 1, 1973. Services will be reduced drastically on 10 refuges, and 16 will be closed. The affected refuges are located in 16 states ranging from Texas to Florida, Vermont to North Dakota. Additionally, budgets for many of the approximately 324 other refuges have not been increased enough to cover salary increases and inflating costs of equipment and materials. Thus the number of minor budget cuts, which inevitably will result in decreased emphasis on wildlife and associated public values, probably far exceeds the 26 refuges for which major or total program curtailment is planned.

Before attacking the Bureau of Sport Fisheries and Wildlife or the Department of the Interior for closing refuges and decreasing other services, one should look at the issues and facts. For the past several years the total budget for all wildlife refuges has been nearly static, or the same from year to year, apparently because of the Office of Management and Budget (OMB), which passes judgment on the proposed budgets and expenditures of all federal agencies. During these years of static budget the rate of inflation has been high and salaries

This is a report prepared by the staff of "National Parks and Conservation Magazine," and printed in the June 1973 issue of their publication.

have increased substantially. In addition, many refuges have been added to the national wildlife refuge system—nine having been added since June 30, 1972. All these increases have tended to substantially reduce the *real* budget of the system. Hence, for the coming fiscal year, those responsible for maintenance of the system have had to make some hard decisions on priorities. The threatened closures, major reductions, and many minor reductions in the refuge system have sprung from these hard decisions.

It would seem pointless for NPCA or others to berate the Bureau of Sport Fisheries and Wildlife for reductions that cannot be avoided. Money that is not there cannot be spent.

The OMB seems to exercise control over federal expenditure in at least two ways: (1) it controls the amount of money requested from the Congress; and (2) it impounds (withholds) funds that have been appropriated by Congress. For example: the Environmental Protection Agency is not able to spend millions of dollars appropriated for the Clean Water

Program, because OMB has impounded the money. (NPCA at Work: Feb. 1973.) The other type of control seems somewhat more insidious and less visible, for OMB exerts major influence before the public or Congress knows the amount of money that is actually necessary.

We may assume, for example, that the Bureau of Sport Fisheries and Wildlife wants enough money to operate the refuges adequately. However, NPCA is advised that before the Bureau is allowed to make budget requests, OMB has, through instructions to the budget office of the Interior Department, indicated what percentage increase in budget request, if any, will be allowed for the coming fiscal year. The Bureau then prepares a tentative budget request based on those instructions.

However, before the request becomes a part of the Administration budget and is submitted to Congress, OMB takes yet another swing at a budget request that may already be too low to allow the Bureau of Sport Fisheries and Wildlife to adequately perform the activities mandated by Congress. This last blow (assuming funds are not impounded following approval by Congress) comes during a hearing before OMB budget examiners. After the hearing, decisions are made, presumably by the budget examiners and others in authority at OMB, regarding the requested expenditures that are to be allowed. (It is not clear, incidentally, how, or on the basis of what criteria, the decisions are made.)

In any event, once decisions are made, the Bureau is told what its budget requests will be. In recent years the best description of these requests is inadequate and insufficient. (However, it should be made clear that the appropriate division of the Bureau has the power to allocate its funds between projects.)

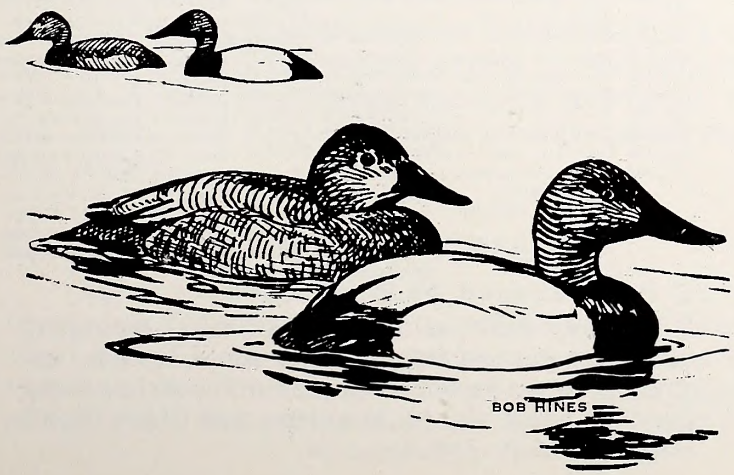
As NPCA has been able to piece them together the sequence of events in the approval of an agency's budget for any given fiscal year seems to be: (1) winter-spring of the preceding year—message from OMB indicating percentage increase in request, if any, to be allowed. (2) late spring-summer of preceding year—tentative guidelines are developed during contact between Interior's budget office and OMB. (3) September-October of the preceding year—hearings at OMB to decide what requests will be made. (4) January of the current year—total Administration budget request submitted to Congress for approval. (5) July 1, the new fiscal year—budget takes effect, assuming approval by Congress.

Thus, the refuge closures that will begin in July of this year apparently cannot be changed in any meaningful way. Hope for our wildlife refuges and the entire environmental movements as well seems to lie with the future.

A number of questions remain to be asked in the context of this report. Why, and on what basis, is the public excluded from the workings of OMB? How are the decisions made that tend to force agencies of government into dereliction of the jobs that are mandated by Congress? Why are the provisions of the National Environmental Policy Act of 1969 not followed? What are the criteria by which decisions are made? The public apparently cannot even evaluate decisions, because the decisions are hidden and internal mechanisms are vague at best.

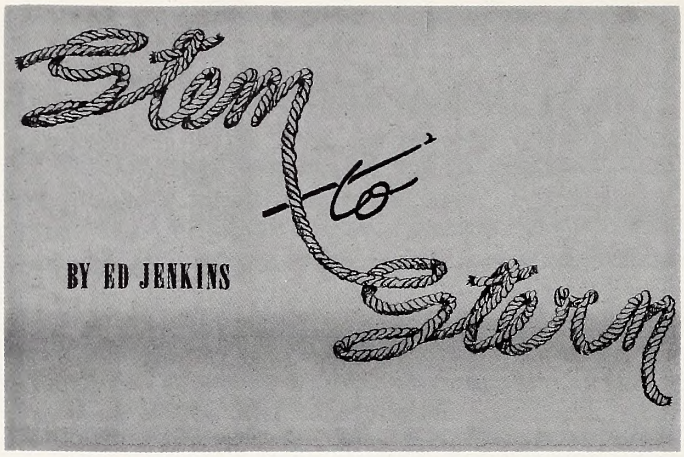
Wildlife refuges were set aside primarily to benefit wildlife; however, now the refuges are apparently not allowed adequate money to accomplish this task. Unfortunately, and alarmingly, the problem is bigger than refuges alone; it is bigger than BSFW; it certainly affects the National Park Service, the entire Department of the Interior, and indeed the whole federal executive structure. It threatens in a very real way to frustrate the efforts of many agencies of government to maintain a livable environment.

NPCA has written OMB asking for two things: a description of OMB structure, and personnel relating to natural resource programs; and the reason why OMB does not follow the pertinent requirements of the National Environmental Policy Act when making substantive natural resource decisions. Members who wish to ask additional or similar pertinent questions for themselves, or want to urge greater consideration for needed environmental programs, should write expressing their concern to: Mr. Harry C. McKittrick, Chief, Interior Branch, Office of Management and Budget, New Executive Office Building, Washington, D. C. 20503.



CLOSURES SCHEDULED
Deer Flat NWR, Idaho
Minidoka NWR, Idaho
Big Stone NWR, Minn.
Valentine NWR, Nebr.
Sheldon National Antelope Refuge, Nev.
San Andres NWR, N. Mex.
Swanquarter NWR, N.C.
Lostwood NWR, N. Dak.
Sullys Hill National Game Preserve, N. Dak.
Optima NWR, Okla.
Hagerman NWR, Tex.
Muleshoe NWR, Tex.
Missiquoi NWR, Vt.
Fisherman Island NWR, Va.
Mason Neck NWR, Va.
Wallops Island NWR, Va.

MAJOR REDUCTIONS SCHEDULED
Big Lake NWR, Ark.
Lake Woodruff NWR, Fla.
Flint Hills NWR, Kans.
Clarence Cannon NWR, Mo.
Desert National Wildlife Range, Nev.
Cedar Island NWR, N.C.
Pee Dee NWR, N.C.
Pungo NWR, N.C.
Slade NWR, N. Dak.
Buffalo Lake NWR, Tex.



New Personal Flotation Device Rules

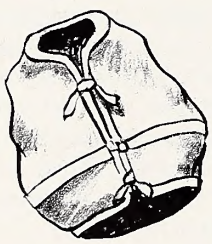
Coast Guard PFD Regulations Now Mandatory

Effective: 1 April 1972—One Coast Guard approved personal flotation device (PFD) for each person aboard recreational boats, including sailboats, rowboats, kayaks, and canoes. New PFD's bearing Coast Guard approval identified by "Types I, II, III, or IV."

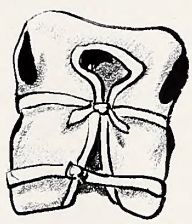
Mandatory: 1 October 1973—(1) Boats sixteen (16) feet or over in length: one Type I, II, or III (wearable) for each person on board and one Type IV (throwable) in each boat. (2) Boats less than sixteen (16) feet in length and all canoes and kayaks: one Type I, II, III, or IV PFD for each person on board.

Type I—A Type I PFD is an approved device designed to turn an unconscious person in the water from a face downward position to a vertical or slightly backward position, and to have more than 20 pounds of buoyancy. Recommended for offshore cruising. Acceptable for all size boats.

Example: Typical life preserver



Type I



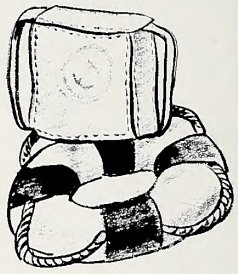
Type II

Type II—A Type II PFD is an approved device designed to turn an unconscious person in the water from a face downward position to a vertical or slightly backward position and to have at least 15.5 pounds of buoyancy. Recommended for closer, inshore cruising. Acceptable for all size boats.

Example: Typical buoyancy vest

Type III—A Type III PFD is an approved device designed to keep a *conscious* person in a vertical or slightly backward position and to have at least 15.5 pounds of buoyancy. While having the same buoyancy as Type II, the Type III has a lesser turning ability to allow for a comfortable design for water activities such as water skiing. Recommended for in-water sports, or on lakes, impoundments, and close in-shore operation. Acceptable for all size boats.

Type III



Type IV

Example: A special purpose device

Type IV—A Type IV PFD is an approved device designed to be *thrown to a person in the water and not worn.* It is designed to have a least 16.5 pounds of buoyancy. Acceptable for boats less than 16 feet and canoes and kayaks and as a throwable device for boats 16 feet and over in length.

Example: Buoyant cushion Ring buoy

Any recreational boat which complies with the new regulations before the mandatory date of 1 October 1973, shall be considered in compliance with existing lifesaving requirements.

All Coast Guard approved personal flotation devices bear markings as to manufacture, type, and approval number. Many kinds of PFD's are in existence. This "conversion" table gives equivalent "type" information for existing devices that may not be marked as "Type I, II, III, or IV."

Number on Label	Devices Marked	are Equivalent to
160,002	Life preserver---Performance Type I	personal flotation device
160,003	Life preserver---Performance Type I	personal flotation device
160,004	Life preserver---Performance Type I	personal flotation device
160,005	Life preserver---Performance Type I	personal flotation device
160,009	Ring life buoy---Performance Type IV	personal flotation device
160,047	Buoyant vest----Performance Type II	personal flotation device
160,048	Buoyant cushion-Performance Type IV	personal flotation device
160,049	Buoyant cushion-Performance Type IV	personal flotation device
160,050	Ring life buoy---Performance Type IV	personal flotation device
160,052	Buoyant vest----Performance Type II	personal flotation device
160,055	Life preserver---Performance Type I	personal flotation device
160,060	Buoyant vest----Performance Type II	personal flotation device
160,064	Special purpose-water safety buoyant devices	A device intended to be worn may be equivalent to Type II or Type III. A device that is equivalent to Type III is marked "Type III Device — may not turn unconscious wearer." A device intended to be grasped is equivalent to Type IV.

If in any doubt as to your lifesaving equipment, take advantage of the free courtesy motorboat examinations or Federal equipment checks given by the U.S. Coast Guard Auxiliary and Coast Guard Boating Safety Detachments.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Dove Seasons Set

The season on doves is set to open at high noon on Saturday, September 1. The first segment of a split season will run through October 6, and the second will open December 11 and close January 12. Bag limits again are 12 daily, 24 in possession with shooting hours from noon to sunset.

The September 1 choice of the first season opening is popular with hunters, most of whom will be able to hunt on Labor Day (Sept. 3) afternoon as well. See hunting regulations for location of game lands open to dove hunting.

Annual Hunting and Fishing Day

President Nixon has proclaimed Saturday, September 22 as National Hunting and Fishing Day throughout the nation. Many Tarheel wildlife and hunting clubs will hold open house for their nonhunting city neighbors, and give demonstrations on sport fishing techniques and safe gun handling.

Fishing Regulation Hearings Set

The Wildlife Resources Commission will meet September 24 to approve proposed changes in the 1973 fishing regulations for presentation at the following public hearings:

October 8, 1973	Asheville	Buncombe County Courthouse	7:30 p.m.
October 10, 1973	Salisbury	Rowan County Courthouse	7:30 p.m.
October 11, 1973	Washington	Beaufort County Courthouse	7:30 p.m.

Adoption by the Commission of the 1974 Fishing Regulations will take place at the Commission's meeting on October 29.

Hunter Safety Training Paying Off

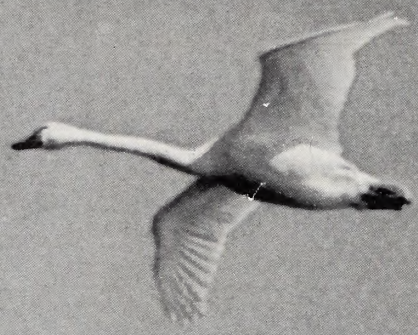
The Wildlife Resources Commission's hunter safety training program has made excellent progress since it was started two years ago. A careful analysis of fatal and non fatal hunting accident reports shows that hunters who have not taken the training course are involved in 98 per cent of the total accidents.

Timberlands Added to Game Lands

An agreement reached between the N. C. Wildlife Resources Commission and Champion International Corporation of Canton, N. C. adds nearly 100 parcels of land totalling 51,454 acres to the Game Lands program of the Wildlife Commission. The larger tracts of this land are located in the western counties, and all 51,454 acres will be open to hunting this fall.

Wanton Waste

By Mrs. Robert Hull
Alexandria, Va.



HE sat in his comfortable chair in the living room and puffed away on his favorite after-breakfast pipe. It seemed to him, now that he had retired, that this period of the day refreshed him more than a good night's sleep. All the former pressures and strains of his work-disciplined life had ended and he could take his ease.

This morning his mind centered on the events of his past life. It seemed to him that he was looking at his own life through the eyes of another person. He remembered a little tousled-haired lad building a birdhouse one spring so that the tiny wrens would have a home in his mother's garden. He recalled the outrage that he felt, as an older boy, when he saw a dog with tin cans tied to its tail by a couple of young boys. The dog, frenzied by the cans, ran to his death on a busy street.

Then there was the young man bicycling down the road to work past the tall north woods. He used to imagine the Indians living peacefully in those woods, hunting, fishing in the nearby streams, and living their quiet, simple lives. Then the developers came and he watched them ruthlessly cut down the beautiful woods, leaving nothing but bare ground to be replaced later by little box-like houses.

The years passed through his mind rapidly. His blue-eyed wife with her quick flashing smile had filled his heart with joy and made their home a place of peace and happiness. He was glad that down through the years she had been a wise and careful manager. Yes, like many others of their age group, they had had their lean years, but they had always managed, the two of them together, to pull through the bad times. And now they had their dreams fulfilled and enjoyed every moment in their lovely lakeside home. It was a beautiful spot, the house surrounded by tall trees and the yard going down to the water's edge. In the summer, it was cool, and in the winter, the house was cozy and warm.

Having leisurely finished his morning smoke, the man walked out to the enclosed front porch where he could gaze upon his beloved lake. It was one of those crisp fall days that enabled him to see across the lake. The bare trees in his yard stood still in their nakedness, revealing the brown earth around them. In a crotch of one tree, he could see the leafy nest that the squirrels had been building for days. Today, the lake was quiet with a mirror-like surface. Usually, if it was not rough, there was some movement of the lake's surface. But today, there seemed to be no movement at all, and a deep silence prevailed as if in expectation of something unusual.

Call it killing by mistake or ignorance, for whatever reason it is done, scenes like this are repeated time and again even though strict State and Federal law prohibit it.

Suddenly, he saw something white swoop through the air and come to rest upon the glassy waters near his house. He looked carefully and long at the white object resting gracefully on the surface of the lake. In all of his years in that area, he had never heard of a swan in the neighborhood. He stood transfixed at the beautiful and rare sight. As he stood there, he breathed a silent prayer of gratitude to his Maker that he had been privileged to gaze upon such grace and beauty floating on the water in front of his yard.

Supposing he had been in the house or back at the garage—he would have missed it. He wanted to call his wife but he dared not move lest the slightest sound disturb the swan. But he stood wishing he dared call her to share in this glorious moment.

Suddenly, there was a crack from a gun, a splash of red on the white body and the graceful neck fell limply in the water. The man ran down the steps shouting: "Stop! Stop! Stop it!" But he knew his words fell dead upon the air as the swan floated dead upon the water. He looked around, and there in the yard next to his, he saw a blue-jeaned youth crouched near a tree.

"Get it out of the water", the man roared in fury at the youth who looked well-pleased with his expert marksmanship. The youth seemed at first incredulous that anyone had noticed or would be angry. Then, suddenly as he looked at the man, it dawned upon him that the man was perfectly furious and that it was only years of self-control that kept his rage in check. Almost fearful of what the man might do to him, standing there and shaking his fist, the youth quickly dropped the gun and ran to his boat to get the swan.

The man turned with leaden feet and slowly walked back to his house. He did not feel his shoulders shaking nor his body trembling. It was only when he wiped away the wetness on his cheeks that he realized he had been weeping, the first time in many years.

GRANDPA

THE old man died many years ago, but I can still hear him as if he were here today. "There is nothing prettier than the place your cork was." He told me that when I was six. I could always find him moving among the willows on the bank, nimbly stepping from rock to rock, skillfully working his hook into the mouths of the biggest fish of the river.

No one really knew who he was, though everyone knew him. He was Grandpa to his friends and to those who came to fish in this part of the river. Some days when the fish were not biting, I sat for hours listening to his tales of the old country, or learning how to make a whistle from a willow branch. Once, when the fish were beginning to bite, I got over-anxious. As soon as my cork disappeared, I jerked my pole, sending the line and a fish up into a willow along the bank.

"We're after the fish, not their tonsils," he scolded while shinnying up the tree to free my hook.

Toward the end of the day, as if he had a schedule to keep, the old man looked toward the sun, gathered in his line, picked up the fish and worked his way up the hill toward the Grey Owl, where a cool sweating mug of dark draft awaited him. By the time the old man downed a good draught, other fishermen of the river gathered around and tried to coax from him his secret of continued success. After several diplomatic denials to give up his method, Grandpa smiled, adjusted his suspenders, and began. "Well, I tell you how to catch them biguns." He shifted his small feet and brushed back his long silver hair. Glancing over his gold rimmed bifocals and gesturing with his mug, the old man told them, "Do you spit on your hook before you throw it in? It's the only way to catch'em."

The old man finished his beer among the cheers and laughter of his admirers and we left, with me straining as I proudly carried our catch down the steps.

They laughed at his secret but he got his turn. When the sun dipped and the fish began to bite, he enjoyed pointing out the elaborately equipped sportsmen secretly spitting on their hook while glancing furtively, hoping no one had seen.

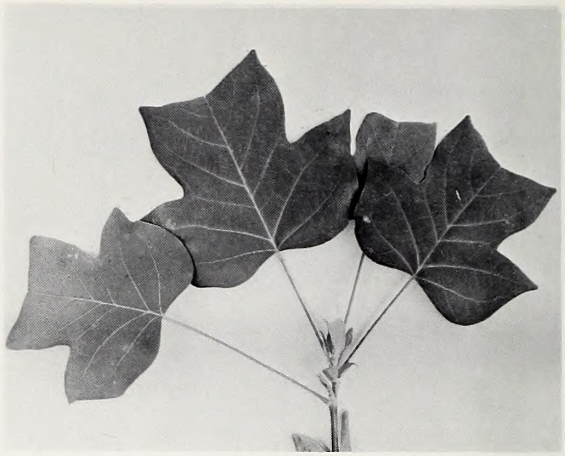
"You gotta drown it," Grandpa would yell across the river loud enough for all to hear. With his hands on his hips he threw back his head and bellowed until he was so out of breath that he had to sit down.

Yes, the old man died many years ago. Where the Grey Owl was there is now a highway. Most people have forgotten his daily crusade to the river; however, there are a few of us who come by late in the evening, carrying our catch on heavy stringers as if to show him how well we learned his tricks, or to tell him that we spit on our hooks. But the main reason we come day after day to visit the cold grey stone on the river bank is to read to our grandsons its golden warm message, "There is no sight in the world prettier than the place where your cork was."

Lee Morrison

By R. Reader and H. Lieth
Botany Department, University of North Carolina
Chapel Hill

Toward a Phenological Calendar in North Carolina



TULIP POPLAR

Native fruits and vegetables are available only at certain times through the year, according to a schedule with which we become familiar. The migration and nesting of each species of bird have their regular place in Nature's calendar. So it is with various stages of insect life, the hiberation times of certain mammals, and various other phenomena of the living world. Observing and noting the occurrence of recurring events permits us to construct a natural calendar and to superimpose it on the astronomic or civil calendar, marking the seasons by biological events rather than calendar dates. In this article we describe some efforts of the North Carolina Phenology Project in compiling a phenological calendar for North Carolina.

TO our recent appeal for phenological information (*Wildlife,* March, 1973) several individuals have responded. Mr. Herman Eggers, of Boone, North Carolina sent us a copy of his 1972 list of first flowering dates for 139 native plants growing at an elevation of 3,330 feet. Mr. Ken Moore, Superintendent of the North Carolina Botanical Garden (elevation 290 feet) in Chapel Hill furnished us with a similar list of 1973 spring flowering dates. Mr. J. L. Perry of Cofield, North Carolina (elevation 43 feet) sent us his records for the flowering of 32 native and agricultural species during the period 1949 through 1968. We thank all three gentlemen for their important contributions.

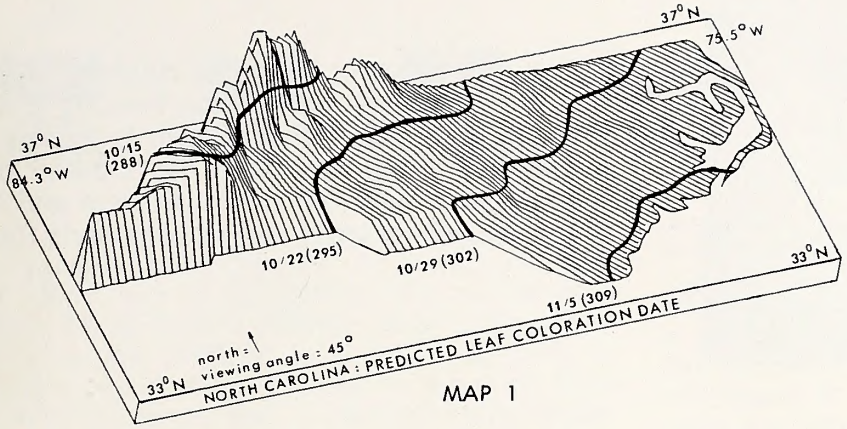
Several examples of the economic importance of a phenological calendar were included in their letters. Mr. Perry found that he needed to know the flowering dates of nectar-producing plants when he started to keep bees. Mr. P. F. Brown of Oak Ridge, Tennessee required similar information, not only for beekeeping but also because he uses the flowers and fruits of a series of pasture and tree crops as pig feed. The flowering and fruiting dates of these species are of utmost importance to him. Mrs. Dortha Franck of Cranberry, North Carolina has discovered that the relationship *between* phenological events is also of importance. She harvests her mustard greens just before the lilac blooms. These three individuals have applied their knowledge of the local phenological calendar. We look forward to hearing from other North Carolinians who have made similar phenological observations for these and other purposes.

Since a phenological event does not occur simultaneously at all points in North Carolina, we are currently attempting to define phenological time zones for the state.

Phenological Time Zones

The flowering dates of several species were present in all three of the flowering calendars mentioned above. If we compare the Boone (mountain), Chapel Hill (piedmont) and Cofield (coastal plain) dates for any one species, we are able to illustrate the concept of phenological time zones in North Carolina. For most of the 11 species included in Table 1 the flowering dates in mountain populations occur up to one month later than for piedmont and coastal plain populations. The mountain populations are found in a different phenological time zone than are piedmont and coastal plain populations of the same species. We are not certain that the piedmont and coastal plain populations lie in unique phenological time zones since most of the coastal plain dates were taken from pressed specimens in the Botany herbarium of the University of North Carolina. We need flowering dates from other locations in the state to extend this type of comparison.

The best way to document when spring occurs across the state is to collect flowering data from a number of locations during the same year. We are currently attempting to define phenological time zones for selected species in North Carolina by asking interested individuals in a number of locations to record the flowering dates of redbud (*Cercis canadensis*) and dogwood (*Cornus florida*)



MAP 1

Predicted calendar date and year date (of the beginning of fall) measured by 50%CC leaf area coloration for (tulip poplar + red maple) /2 in North Carolina. The year date of fall's arrival in your area can be predicted from the fol- poplar + red maple) /2 in North Caro- tion year date + red maple leaf colora- tion year date)/2 = 640.37-4.89 (lat- itude in degrees) -2.10 (longitude in de- grees) -0.00713 (altitude in meters).

in the spring and the leaf coloration dates of tulip poplar (*Liriodendron tulipifera*) and red maple (*Acer rubrum*) in the fall.

Based on three years' data, interested individuals can now predict spring's arrival (leaf emergence in native trees) from an equation relating the averaged first-flowering dates of dogwood and redbud to the altitude and latitude of North Carolina locations. Spring phenological time zones are highly correlated with latitude and altitudinal differences within the state (Map 1, *Wildlife*, March, 1973). Similar time zones for the natural onset of fall are evident when we map the averaged leaf coloration date of tulip poplar and red maple (Map 1). From our own research we have found that this averaged leaf coloration date coincides with the mean leaf coloration date of the whole deciduous forest community in the piedmont region of North Carolina.

Fall patterns are also highly correlated with latitudinal, longitudinal, and altitudinal differences within the state. We have constructed a mathematical equation which expresses the averaged leaf coloration date of tulip poplar and red maple as a function of latitude, longitude and altitude. This equation is presented in the legend for Map 1. We need your help this fall to record the leaf coloration dates of tulip poplar and red maple so that we can test the predictive power of this equation and also to determine the accuracy of the phenological time zones which we have presented. If you would like to record leaf coloration dates, send your name and address to the North Carolina Phenology Project, c/o the Department of Botany, University of North Carolina, Chapel Hill, North Carolina, 27514. We will mail you the forms and instructions necessary to make the required observations. ⬍⬍

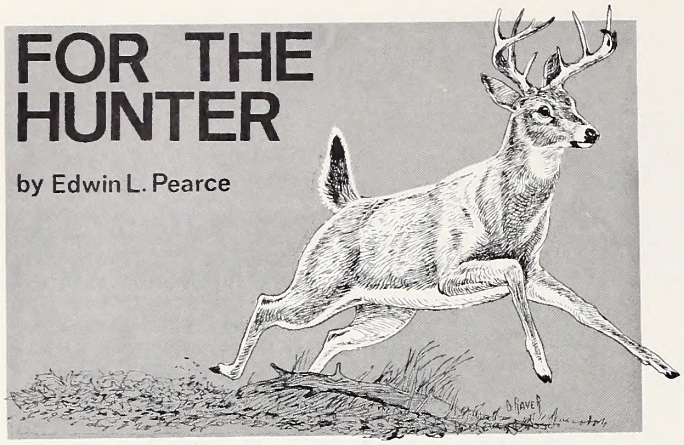
Table 1. Comparison of mountain (Boone), piedmont (Chapel Hill), and coastal plain (Cofield) calendar dates of the first flowering for selected native plants.

Common Name	Scientific Name[1]	First Flowering Date Boone 1972	Chapel Hill 1973	Cofield 1949-68 mean
red maple	**Acer rubrum**	3/24	3/4	2/28
redbud	**Cercis canadensis**	4/22	3/16	3/29*
dogwood	**Cornus florida**	4/30	4/2	4/12
bloodroot	**Sanguinaria canadensis**	4/13	3/18	4/19*
dandelion	**Taraxacum officinale**	4/16	3/25	4/19*
pussy toes	**Antennaria plantaginifolia**	4/22	4/1	4/19*
may apple	**Podophyllum peltatum**	5/16	4/23	4/19*
tulip poplar	**Liriodendron tulipifera**	6/6*	5/13	5/1
yarrow	**Achillea millefolium**	7/4	6/10	5/30*
heal-all	**Prunella vulgaris**	7/13	6/10	5/30*
queen anne's lace	**Daucus carota**	7/23	6/10	5/30*

* Date from pressed specimens, Herbarium, Botany Department, University of North Carolina
1 Nomenclature is that of Radford et al., 1964, *Manual of the Vascular Flora of the Carolinas*, UNC Press: Chapel Hill

FOR THE HUNTER

by Edwin L. Pearce



This new feature, "For The Hunter," is planned for most of the hunting months this fall and winter. The author, Edwin L. Pearce is a Georgia-born hunter who has stalked many kinds of game in 20 states, Europe and Asia. This month he looks at "The Hunter's Guns."

AS a hunter, one of the most important decisions you make is the selection of your firearms. You must be guided by the type of game you intend to hunt and the conditions under which you'll hunt. You should get all the advice you can from experienced hunters. Most hunters shoot a variety of game, and I think you'll find the general consensus to be that you should have a minimum of one rifle equipped with a scope and sling, and one shotgun equipped with sights, an extra barrel for slugs and also a sling. A poly-choke or similar device is highly recommended.

The most widely used rifles are in the 7MM and .30 calibers; the shotgun in 12 gauge. Either the pump or automatic shotgun (if allowed by the law where you'll hunt) with cylinder bore is preferred. With these two weapons, you are ready to hunt all types of game in the United States.

BEFORE you go hunting, learn your weapons. Have a gunsmith boresight your rifle. Then zero it in at 100 yards, or whatever your average length shot will be. Shoot it many times at a stationary target with the exact type of ammunition you'll use in hunting; determine where it'll strike at various distances. Only by knowing this beforehand can you be reasonably sure what to do at all times when hunting. When you can put three consecutive shots within a six inch circle at each of the 100, 200 and 300 yards distances, you're qualified to hunt with that rifle.

By all means, get a special barrel for your shotgun, one designed to shoot slugs. Zero in your shotgun, use the exact type ammunition you intend to use in hunting, and shoot at a stationary target, in this case a half-sheet of newspaper. At 75 yards, three consecutive slugs should be in an eight-inch circle; at 50 yards, all buckshot (usually nine) should strike the target.

As you will probably get more shots at game on the move rather than stationary, you'll need practice on moving targets. Do as many hunting clubs do, devise a life-size deer target which works on ropes and pulleys; left to right, right to left, forward and backward. Two hunters, alternating as shooter and target manipulator, can become very proficient in their accuracy on moving targets in a relatively short time. Practice on skeet and trapshooting ranges is also highly recommended. Be sure the target manipulator is fully protected at all times.

If you know what your weapon will do, you'll not expect too much from it, and you'll likely get game.

Practice the so-called "dry firing." Handle your weapon as often as possible, learn the feel of it, load it and unload it, practice with the sling and adjust it to a comfortable position, simulate field conditions and probable targets. While on the target range, practice estimating distances. Have your buddy move the targets, estimate the distance, shoot and then find out how accurate you were in both estimating distances and in your shooting. If you know your weapon, you'll soon learn to hit targets at the intermediate distances.

This familiarity with your weapon will not only build up your confidence but also your marksmanship; it'll pay off handsomely in the actual hunt and make you a safer hunter to boot.

This Remington Model 760 "Gamemaster" is but one example of many fine high-powered hunting rifles. It is produced in calibers 30-06, 270, 308, 243, and 223 Rem.

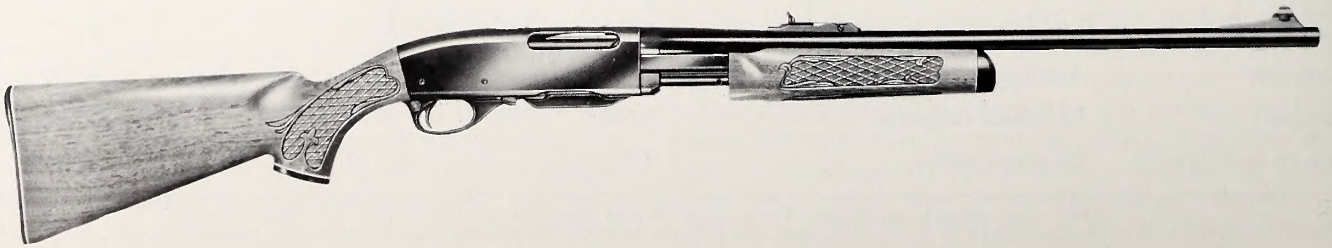


DIAGRAM COURTESY BROWNING

What do you see when you "put it on" a deer? These sight pictures may help in correctly aiming at your target.

WHILE in the Army in Germany, I had an 8mm rifle specially fitted for me by a famous gunsmith, *Herr* Lux of Heidelberg. He started with an 8mm barrel from a German army rifle, added an F.N. action obtained in Belgium, a stock of Circassion wood from France, a 4-power Hensoldt-Wetzlar scope and a German-style bridge mount (the scope is mounted higher than is done in this country, and you could use the iron sights underneath for close shooting without removing the scope). He checkered it beautifully, hand-rubbed the stock, meticulously fitted the face piece and added a rubber shock pad at the butt. I was as proud as a peacock of that rifle, learned to shoot it well and had confidence in it. After you've hunted awhile, you, too, will want a specially-fitted gun. I strongly advise every hunter, or would-be hunter, to get acquainted early in the game with a good local gunsmith; he can help you not only by making periodic technical checks of your firearms but also in many other ways.

I'm a firm believer in dual triggers on a rifle, the forward set trigger and the rear hair-trigger. In our armed forces, the recruits are required to shoot the rifle and qualify on the range. Millions of these young men have never fired a rifle. The instructors find that the most common fault among them is jerking the trigger, which results in pulling the weapon off its target. There are frequent "Maggie's Drawers" (a flag denoting a complete miss of the six-foot target) scored because of this common fault. The shooter anticipates the time of the firing and thrusts his shoulder forward to cushion the shock of the recoil.

The instructors teach that a gradual squeezing of the single trigger is essential to accurate shooting. For the great majority this squeeze is very difficult to learn. Many never learn it. The use of dual triggers eliminates this problem for the hunter. Once you see your target and set (pull back) the forward trigger, all that remains to do is to continue to hold your target and lightly touch the back (or hair) trigger. The weapon fires and you haven't had time to jump the trigger. Also, your rifle has an additional safety factor—that both triggers must be pressed in sequence before firing takes place. In my opinion, the accuracy of the average hunter who uses these dual triggers is so much better than those who rely on the squeeze that it would pay every hunter to have them installed.

Keep your gun clean at all times. Oil them lightly in off seasons, and check them for rust and moisture accumulation at least monthly. When you are ready to shoot in practice or to hunt, run a dry patch or two through your gun to remove the oily, protective coat. This also assures you that the barrel is clear before loading. Don't load it until you reach the practice or hunting grounds. After shooting, unload the weapon, run a cleaning patch through and store it overnight in its carrying case. Avoid standing it in a corner or laying it on or under a bunk at the camp.

I would be violating my own hunting philosophy and experiences if I didn't go on record again and again concerning firearms safety.

The power of a high-powered rifle is truly awesome.

Respect that power and:

(1) Don't shoot within 300 yards of a road or highway or from a vehicle, moving or stationary. To do so is not only unlawful in most states, but is dangerous to human life.

(2) Don't lay a loaded gun unattended on the ground, against a fence or in a car. It takes only a second to unload it, and only by doing so can you completely avoid mishaps. There is a case on record where a dog triggered a loaded unattended gun, and many instances where loaded weapons fired when propped against a fence or placed on the floor of a car.

(3) Don't point a gun, loaded or unloaded, at anything you don't intend to kill.

(4) Before you fire your weapon, be sure you see the target and are sure of its identity. Don't shoot at a disturbance in the bushes or at shaking tree branches. Better that you lose a shot than kill another human being, a dog, horse or cow!

(5) Watch your own gun barrel and those of your hunting companions. Don't be hesitant about telling others of their carelessness if their gun barrel is pointing at you!

GUN SAFETY — remember it when you're around guns, at practice, when hunting, in your home and yes, even in stores. ◆

DOVE TIME

□ **ALL GAME LANDS WITH DOVE DEVELOPMENT**

A. Carson Woods Game Land
B. Cone Mills Game Land
C. Riverview Acres Game Land
D. Braswell and Covington Game Land
E. Cooleemee Plantation Game Land
F. Sauratown Plantation Game Land
G. Sandhills Game Land
H. Caswell Game Land
I. Keith Farms Game Land
J. Corinth Game Lands

O **DOVE HUNTING ONLY**

1. Browntown Farms Game Land
2. Rand-Dale Farms, Inc., Game Land
3. Guilford County Farm Game Land
4. Nutbush Peninsula Game Land
5. Roy Ed Jones Game Land
6. Dorothea Dix State Hospital Game Land
7. Seth Fish Game Land
8. Bill Dail Game Land

Mark your calendar for Saturday, Sept. 1. There are two good reasons. In the first place, the hunting season on mourning doves will open at noon in North Carolina that day.

But it's also a good day to remember to join the "club." This "club" has somewhere in the neighborhood of 2,000,000 acres of specially managed, top quality hunting land in North Carolina. They're called Game Lands, and they are managed by the N. C. Wildlife Resources Commission. "Membership" costs a mere $6 a season and covers all hunting for all season on these Game Lands, as well as all mountain trout fishing.

Not accidentally, dove hunting on these Game Lands is better than it is on most private lands. That's because parts of these Game Lands have been planted especially to attract doves. In fact, there are eight small Game Lands which are managed only for dove hunting. These are shown (numbered 1-8) on the accompanying map.

On these special "Doves Only" Game Lands, dove hunting is permitted only on Monday, Wednesday and Saturday afternoons throughout the split dove season (Sept. 1-Oct. 6; Dec. 11-Jan. 12). The hunting is limited to three days a week in order to insure that the doves will not be chased off by daily hunting, and the result is that these eight areas are among the best dove hunting areas in the state.

Specially planted dove fields are also maintained on many other Game Lands, but the difference is that these other Game Lands are also open to other types of hunting when the seasons come in later in the fall. These Game Lands, which also offer special dove fields, are designated on the accompanying map by the letters A through J. Another difference is that you can hunt doves on these areas during the afternoons on any day that the dove season is open. Some of these areas—such as the Sandhills Game Land—are famous for their fine dove shooting.

Although special plantings and habitat management for doves are not accented on the Wildlife Commission's other Game Lands, your $6 season "membership" gives you access to them, both for dove hunting—which is often excellent—and for other types of hunting later.

A book of maps which provides detailed directions for locating these Game Lands is available free of charge from dealers who issue hunting licenses and permits. These map books also contain other pertinent information about the 2,000,000 acres of Game Lands. You can also pick up a copy of the 1973-74 Hunting And Trapping Regulations from license dealers.

Surveys indicate that the dove population is growing, and this year may be one of the best yet. The N. C. Wildlife Resources Commission's Division of Game appreciates the opportunity to provide these areas and contribute to the enjoyment of sportsmen.

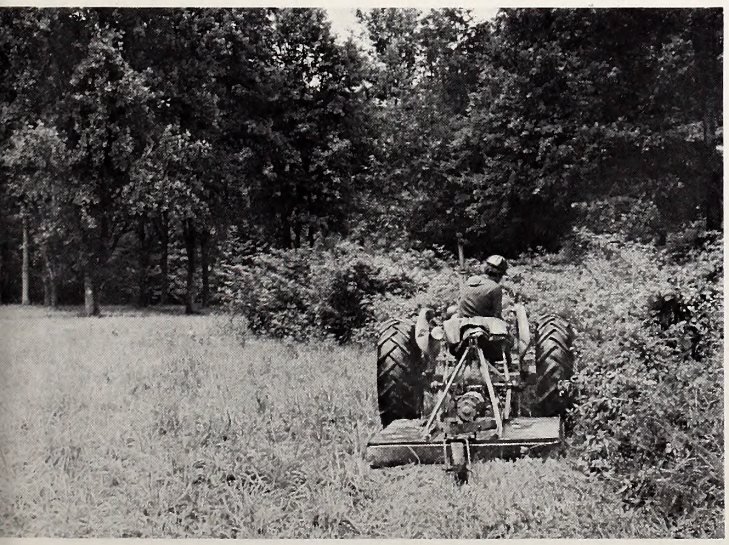
We hope you'll have fun. Be sure to observe the laws and take care to handle your guns safely. Also, return the numbers and information found on banded doves to the U.S. Bureau of Sport Fisheries and Wildlife, Washington, D. C. 20240. ◆

Jim Dean

North Carolina's GAME LANDS ... A Place to Hunt

By Rod Amundson

Regular mowing is necessary to keep down undesirable sprout growth in clearings (lower photo) and in wooded areas (above). Edge effects are often created, permitting native weeds and fruit bearing shrubs to develop. Center, Ed Waldroop inspects fruit trees pruned for better growth.



LOOKING for a place to hunt? Six dollars will get you both hunting and fishing privileges on nearly two million acres of prime hunting and fishing territory.

The Wildlife Resources Commission and its staff realized that although there was substantial acreage of publicly-owned lands opened to hunting and fishing, the demand for free access to improved areas was increasing. Dynamic measures were needed and dynamic measures were taken. The expanded Game Lands program was conceived and brought into being.

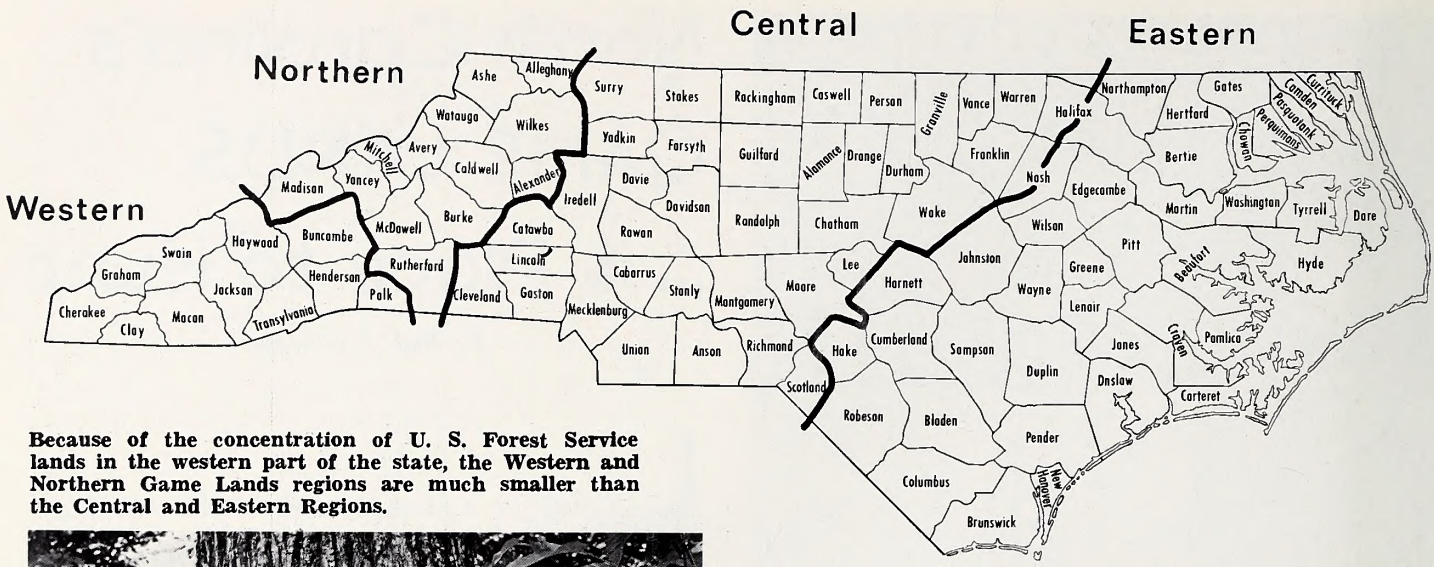
The first step was a complete reorganization of the old Wildlife Management Area system. Over the years Commission-Managed game management areas were involved in a complex of special hunts, special seasons, and special interest groups. This entailed a tremendous amount of paper work and a good amount of confusion.

Wildlife Management Areas are now called Game Lands. For purposes of administration the state has been divided into four parts: Western Game Lands, Northern Game Lands, Central Game Lands, and Eastern Game Lands. To describe these, and give their locations would require more space than can be allotted here. However, the Division of Game has published a compilation of Game Lands maps, and these are available to each person who buys a Game Lands Use Permit.

Under the new system there are no special seasons in special locations for special groups, and there are no longer checking stations. When the seasons are open they are open to all types of hunting and with all types of approved weapons as prescribed in the statewide regulations. A few exceptions, however, do apply.

Under the former system each major wildlife management area had a supervisor and several aides to do management work, law enforcement, road maintenance, and other tasks. Under the present setup each segment (West, North, Central, and East) has a Game Lands supervisor and two to four mobile habitat development crews, the number of crews depending on the amount of land in the section and the type of work to be carried on.

Before the establishment of the Game Lands system there were only 175,000 acres of state-owned wildlife management areas, and another 425,000 acres of land owned by the federal government. These latter



Because of the concentration of U. S. Forest Service lands in the western part of the state, the Western and Northern Game Lands regions are much smaller than the Central and Eastern Regions.

Trout water on game lands will receive various management practices designed to furnish the best fishing. Selected areas have been designated "bear sanctuaries" (below) in order to help restore this fine game animal.

were mostly on U.S. Forest Service lands and Lake Mattamuskeet National Waterfowl Refuge.

Currently all 1.1 million acres of Forest Service lands are included in the Game Lands program and 800,000 more acres acquired by lease or cooperative agreement with large timber companies and small private landowners. The total acreage now under the Game Lands program is just slightly under 2,000,000 and plans call for the acquisition of more acreage as time and money become available. The ownership of the various Game Lands is generally notated in the Game Lands Hunting Maps book.

One of the first major tasks of the new mobile development crews was posting the boundaries of newly-acquired game lands. This involved thousands of miles of border lands and many thousands of boundary markers.

At the present writing the boundary posting is virtually complete wherever landowners have been able to identify their boundaries. The primary purpose of the new program was habitat development and improvement. Hunters will see evidence of this when the hunting seasons get under way this fall. It has already become apparent that under the new system habitat development and improvement has increased something like 300 percent. This, of course, will be reflected in improved hunting this fall and in years to come.

No expansive undertaking, however successful and dynamic, is without its problems, and this is true of the Game Lands program. In the Northern and Western Game Lands there is the problem of trail bikes tearing up discontinued logging roads that have been planted to wildlife foods. Campers pull into food patches, build fires, trample food crops, and leave unbelievable amounts of trash and garbage. It is dangerous to leave equipment in fields overnight because of vandalism. This doubles the time consumed in moving equipment to and from work areas.

Everywhere there is the problem of witless people tearing down boundary markers or riddling them with shotgun pellets or rifle bullets. Unique to the Sandhills Game Lands in the Central Game Lands is the roar of helicopters on maneuvers during the nesting season for wild turkeys. Area personnel believe that this year the "choppers" have frightened wild turkeys in much of the area, and sportsmen report declining populations due to interference with nesting activity.

(Editor's note: The foregoing is an introduction to a series of articles on each of the Game Lands. Each has its unique topography, vegetation, wildlife species, and objectives.) ⬍

When the dove season opens at noon on Saturday, September 1, Tarheel hunters embark on a hunting season the length of which can be duplicated by few other states.

There will be continuous hunting for one species or another until February 28 when the season on raccoon and opossum expires. On commercial shooting preserves the season is even longer, and there is a wild turkey season from April 13 to May 4.

Again this year hunters, for a $6.00 fee, will have hunting and fishing privileges on nearly 2,000,000 acres of Public Game Lands. Millions of other acres of private land will be opened to hunting, but the availability of hunting on private lands is rapidly decreasing.

Why? Too many hunters, most of them uninvited, leave gates open, break down or cut fences, leave an assortment of litter, shoot too close to livestock or farm buildings, and otherwise misbehave. Such misconduct occurs especially near metropolitan areas.

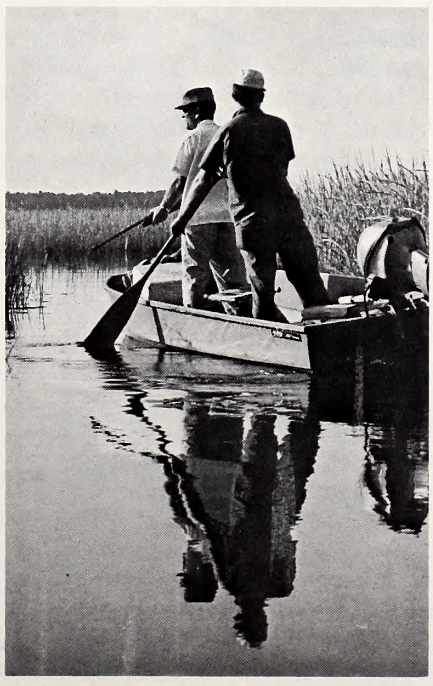
In an effort to provide more hunting on privately owned land, or at least to decrease the rate of posting, the Wildlife Resources Commission each year produces posters that read: "HUNTING BY PERMISSION ONLY." These are available on request, free of charge. Although they do not constitute posting as such, they present a challenge to the sportsmanship of the hunter. They imply that the landowner is willing to allow hunting on his land if the sportsman will have the courtesy to ask permission.

A hunter who is gentlemanly enough to ask permission is not likely to make a nuisance of himself. He becomes a guest, not a trespasser.

TIDE TABLES
Southport, N. C.

Times shown are Eastern Standard Time. Add one hour to convert to Daylight Saving Time.

September	Time (EST)	Tide Height
14F	8.36 AM	5.1
15S	9:19 AM	5.1
17M	11:01 AM	5.1
18T	12:02 PM	5.0
21F	3:23 PM	5.0
22S	4:23 PM	5.1
24M	6:13 PM	5.3
25T	6:41 AM	5.2
25T	7:02 PM	5.2
26W	7:30 AM	5.4
27T	8:13 AM	5.4
28F	8:54 AM	5.3
29S	9:37 AM	5.2
October		
11T	6:45 AM	5.1
12F	7:31 AM	5.4
13S	8:15 AM	5.5
15M	9:54 AM	5.5
16T	10:51 AM	5.4
17W	11:52 AM	5.2
18T	12:57 PM	5.0
23T	5:35 AM	5.1
24W	6:22 AM	5.3
25T	7:07 AM	5.4
26F	7:49 AM	5.4
27S	8:30 AM	5.3



Friends of the Turkey

Wild turkey hunters and all others interested in this great game bird should take note of the newly formed organization, The National Wild Turkey Federation. Headquartered in Edgefield, South Carolina, it "is a nonprofit organization composed of dedicated sportsmen, conservationists and game biologists who enjoy the greatest hunting in the world, who practice sound wildlife management and conservation, and who sincerely believe in preserving and propagating the grandest of all game birds—the American wild turkey."

Their quarterly publication "Turkey Call" is a fine magazine and is part of the package each member receives for the regular membership fee of $10.00 annually. Inquiries should be addressed to "The National Wild Turkey Federation," PO Box 467, Edgefield, South Carolina 28924.

What About Moccasins?

Dear Sir:

My Dad and I had a disagreement about where water moccasins are found in North Carolina. Are there any in Wake and Orange counties? Thanks for your help. I like your magazine.

Sincerely,
Rick Robinson
Chapel Hill

Dear Mr. Robinson:

Thank you for your recent letter about water moccasins.

In reply to your question, this depends on your definition of water moccasin. True water moccasins are related to rattlesnakes and copperheads, all classed as pit vipers because of the depression on each side of the head between the nostrils and the eyes. All are poisonous.

The poisonous water moccasin, or cottonmouth, is found as far

KNOW YOUR PROTECTOR

George E. Ford

Wildlife Protector George E. Ford was born April 25, 1943 in Martin County. He is the son of Mr. and Mrs. H. W. Ford of Parmele, N. C. He attended Robersonville High School. George is married to the former Barbara Stancil of Wilson, N. C. They have two children and attend the Center View Baptist Church.

Prior to his employment with the N.C. Wildlife Resources Commission, George served two years with the U.S. Army in Viet Nam. After his discharge from the Army, George worked as a forester for the Butler Land and Timber Co. of Columbia, N. C. George completed the wildlife protector's pre-service training school in June 1969. He was employed as a Wildlife Protector Trainee in October 1969 and stationed in Spindell, N. C. In January 1970 George was transferred to Dobson in Surry Co. He has completed five in-service training schools.

In 1972 George was awarded the Woodmen of the World Conservation Award. For the past two years he has served on the District Water Safety Team. George is a member of the Southeastern Association of Game and Fish Comm., N. C. Law Enforcement Officers Association, and is a Hunter Safety Instructor.

west as Warren and Halifax counties and eastern Wake County.

Many people refer to all water snakes as moccasins. The nonpoisonous water snakes are found everywhere in the state except perhaps the upper slopes of the mountains. You won't find the cottonmouth moccasin in Orange County.

Sincerely,
Rod Amundson

Whew ! !

Dear Sir:

Being an avid follower of "Wildlife in North Carolina" for seventeen years, I was not too alarmed about the May, 1973 issue with the article on the American alligator by Betty R. Ford which contained much misinformation, but when I read the June, 1973 issue on "Endangered Species" by Dr. Rowland Shelley, I thought it time to express my opinions on both articles because I believe it unethical to mislead our dedicated sportsmen with articles which are based on halfvast facts and not on a thorough knowledge of a given subject.

In the article on the American alligator by Betty R. Ford, she claims that alligators and crocodiles are "murderers". In reality, larger specimens seldom fight. The article states that baby alligators command a large market and are sold at pet stores. This has not been the case for many years. Pet stores, until 1973, did sell baby caimans, a species from South America which resembled the American alligator. This legal source of supply has now been curtailed and the baby caimans sold now enter this country under false information. Mrs. Ford also stated that the American alligator is doomed if world-wide control is not placed on the species. This, too, is not the case. In certain areas of the United States, the population of alligators is increasing and under controlled conditions, could be harvested. The principal decline of the alligator in the southeast has been caused directly by man's encroachment on the animal's habitat. When man moves into alligator territory, he thinks he must dispose of the alligators there, because he believes them to be a menace—this, legally or illegally, he usually does.

The most appalling statement by Mrs. Ford is her statement that "with no redeeming factors, or useful purpose, the alligator is not a champion in wildlife protection". Misinformation like this does more harm to the alligator populations than no information. In reality, the American alligator plays a very significant role in the preservation of all swamp wildlife. Their fondness for the slow moving fishes, such as the longnose gar, bowfin and eastern lake chubsucker help control the populations and by this, increase the game fish populations; namely, the chain pickerel, redfin pickerel and largemouth bass. When turtle populations become over abundant, the alligators feed heavily upon and reduce their numbers down, thus eliminating a turtle disease outbreak. Their diet also consists of snakes and when you find substantial alligator populations, you find few cottonmouths.

Alligators dig deep "wallows" in the swamps near their dens. These "wallows" play the part of a "Noah's Ark" during periods of drought. During such periods of little rainfall, the swamps dry up with a great many species of fishes managing to reach an alligator "wallow". Here the fish survive to again return and to repopulate the state once the rains return and the swamp fills. If it were not for these "wallows", the swamps which produce good fishing, could be void of most fish life. Also, during periods of drought, the deer, raccoons, opossum, bears and various species of birds visit the water holes for survival. Without these "wallows" mammals and birds would have to leave or perish.

As I pointed out above, the American alligator is a champion in wildlife protection and your excellent magazine should strive to point this out.

As to Dr. Rowland Shelley's article entitled "Endangered

Wildlife", it appears that he or whoever prepared the endangered species list got carried away. My comments are based on fact, not hearsay, inasmuch as I did the original survey work in the Lumber River system which includes the Waccamaw River and its tributaries. Also, I am the co-author of the life history of the Waccamaw silverside which appeared in the 100th Transactions of the American Fisheries Society.

I personally cannot accept, as fact, that the pine woods darter *Etheostoma mariae,* creek chub, *Semotilus atromaculatus,* Waccamaw darter *Etheostoma perlongum,* Waccamaw killifish *Fundulus waccamensis* and the Waccamaw silverside *Menidia extensa* are endangered, or, in the case of the latter three, endangered by the spraying of silvex in the canals around Lake Waccamaw. I have followed the procedure for the control of alligator weed in the canal around Lake Waccamaw since early 1960 and I have not observed any adverse effects of the spraying of silvex on the populations of waccamaw darter, waccamaw killifish or waccamaw silverside during a twelve-year period.

The word "endangered" means a species or sub-species where prospects for survival *are in immediate jeopardy.* In all five cases, as well as for the Carolina madtom *Noturus furiosus,* I cannot call them endangered under the above definition. True, three are truly endemic only to Lake Waccamaw but, at present, they are not in immediate danger of being lost forever.

It would appear that "environmentalists" are adding names of the species to the list *without* a knowledge of all facts. Don't you think that professionals working in the field of wildlife *management* should not yell "wolf" until they are sure there is a "wolf"? When conservationists call "wolf" too many times, no one heeds their call when the "wolf" really comes.

Darrell E. Louder, Director
Division of Fish & Wildlife
Delaware Dept. of Natural Resources and Environmental Control
Dover, Delaware

• **DOVES continued from page 9**

I heard Bret shoot and turned around in time to watch the dove plummet downward. "I got one Dad"! he exclaimed, racing to the downed bird. His eyes showing all the excitement that aroused our forefathers years ago, when hunting was a must. The camera was brought along for just this purpose, and I snapped one with the excitement still flush in his cheeks. Memories flashed back many moons ago when I made my first kill on doves. The place was different, but the excitement was the same.

Most hunters can find some dove shooting near home. Now with this big break through of Game Lands by the Wildlife Resources Commission, more land is now open to dove hunting (see page 20). Now with the six dollar Game Lands Permit, the hunter can shoot all game land in North Carolina with the same permit. So if you are taking a vacation, or any business trip during the dove season, it's a good idea to take that thunderstick along just in case you have a free afternoon. In all probability, there will be some land nearby where you can shoot doves.

Many hunters enjoy their doves on the table as well as in the air. Eating wild meat after the trip makes the next jaunt just that much more desirable. There are many ways to prepare the dove. From bogged down in rice (as the hunters along the Coastal Area call it) to roasted breast of dove basted with sherry. Here is one savory way to prepare doves with simple ingredients. Braised Doves. Take six dove breasts, coat with seasoned flour by shaking same in bag. Brown all sides in fat. Remove breasts, leave 3 tablespoons fat in skillet.

Then sift in 2 tablespoons flour and brown. Stir in salt, pepper and water to make gravy. Place browned doves in gravy and cook over low heat until tender. Serves 1 hungry hunter, or 3 to 4 non-hunters. Now the only problem, will the shells hold out until enough birds are bagged for the next meal . . . . ⬍

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RUTH ANN BURGESS

Beach Combers

Our coastal waterways, beaches, and even the sea itself, all have gulls of many varieties, gliding, diving, soaring, searching for food. Some are virtually silent, others incessantly noisy, each with its own personality.

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Wildlife

IN NORTH CAROLINA

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PHOTO BY TOM ROLLINS

Squirrel and Dear

What a place for a lunch break! It's not all hurry and scurry for this squirrel even though he may become fair game on October 15.

STATE OF NORTH CAROLINA

JAMES E. HOLSHOUSER
GOVERNOR

DEPARTMENT OF
NATURAL AND ECONOMIC RESOURCES
JAMES E. HARRINGTON, JR.
SECRETARY

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage except APO and U.S. possessions. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 100,120

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII. NO. 10 OCTOBER, 1973

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An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

The long-tailed weasel is probably not a very abundant little animal in North Carolina. In its more northern range, where it changes the color of its coat to white in winter, the fur has a higher value. The weasel is unprotected in North Carolina and there is no closed season on them. Painting by Kent Pendleton.

Jaeger und Wild-Hunting in Germany

by Sarah S. Robinson
Photos by Rhodes and Sarah Robinson

WILDLIFE IN NORTH CAROLINA seldom goes outside the borders of the Tarheel State with its articles, but this month we present a discussion of hunting and wildlife management in Germany for comparison with our system. The author is the former Sarah Sheffield, who is now a graduate student in wildlife management at N. C. State University in Raleigh.

COLORFUL and complicated — those are the words to describe hunting in Europe. About a year ago my husband and I learned just how complicated. We were in Germany with the Army; outdoor lovers that we are, we naively decided, "Sure, let's get hunting licenses!" One month of classes, field trips, written and oral exams later we had been decorated with oak leaves and dubbed eligible *Jaeger*. (That means we could have bought the special license for Americans and the necessary insurance. For Germans it is much harder to hunt, as you'll see later.)

But we did learn interesting German customs, philosophies, and laws. Of course some aspects of hunting there and here are the same—the comradery with fellow hunters, the thrill of working a good dog, the respect for a wily old deer—the abstract things.

But European hunting regulations and management practices evolved to fit conditions almost opposite from ours. I think we can learn a few things from them, though, because they have coped for many years with dense population, limited numbers of popular game, and limited habitat—problems that we must face in the future.

HISTORY

Many German hunting customs have roots in traditions that developed in the Middle Ages shortly after 800 A.D. During these years of javelins and cross bows, the kings controlled hunting. The ceremonies that prevailed in the court also attended the chase. All game animals fell into one of two catagories: *Hochwild,* or "high game", could be killed only by the king himself or by one of the men hunting with him; *Niederwild,* or "lower game," didn't appeal particularly to the king, and with his permission could be taken by common people. Today the terms are still applied, even though there are no more royal prerogatives.

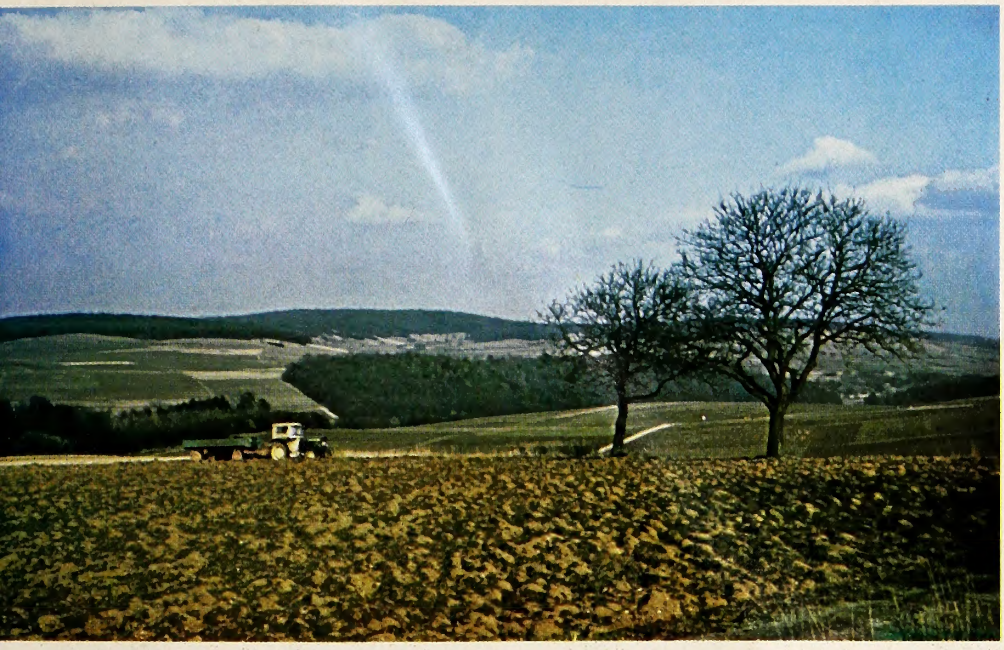
Also beginning in those days was the rich hunters' vocabulary which now contains over 1700 words. Some words name the animals or parts of the animal; for example, blood inside an animal is *Blut;* ouside, it is *Schweiss*. Other words describe hunting ceremonies; *Waidmannsheil* is your greeting to another hunter; with this you are wishing him "Sportsman's luck." And rather than "Thanks" you say *Waidmannsdank* on a hunt.

By 1500 A.D. hunts were elaborate affairs; beaters drove the game into confined areas where the gentlemen did their shooting. There were songs, feasts, and ceremonies. Sometimes the ladies of the court watched. For the next 300 years noblemen still controlled the land as feudal estates, and this brand of hunting flourished.

But at the same time the average citizen was beginning to have some meager rights to game also. Hunting guilds, the ancestors of Germany's prestigious hunting associations of today, were first forming.

After the French Revolution feudal lords lost much of their land, and after 1848 when the German people expressed their desire for a constitutional government, landowners were allowed to hunt on their own property. For a while few hunting laws existed; the peasants shot for revenge; the nobility and the wealthy owned huge hunting preserves and took fantastic bags of game. The cloven-hoofed game nearly disappeared.

The early 20th century saw European countries establishing modern hunting systems with license regulations, open and closed seasons, and consolidated game management. The German Federal



The hilly German countryside (above) is a series of cultivated fields and small woodlots, ideal habitat for roe deer (right, below). The fallow deer (left, below) was introduced from the Mediterranean area and lives primarily in northern Germany.

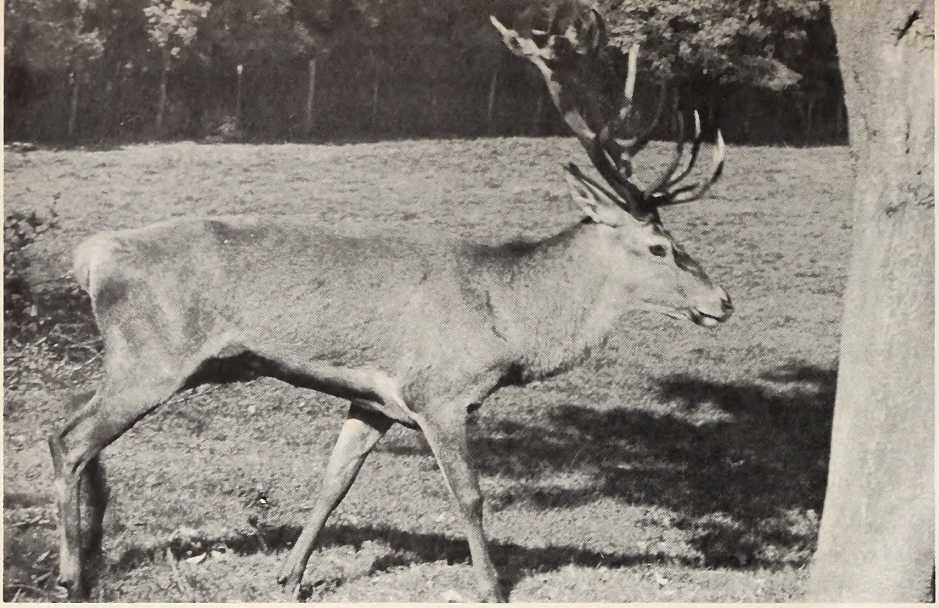
Forests with little undergrowth are common in Germany. This coniferous forest looks almost park-like. Supplementary winter feeding is common.

Hunting Law in effect today was passed in 1961 to replace the basically sound regulations dating from the days of the Third Reich.

One more hunting institution dating from the Middle Ages is Saint Hubertus, the patron saint of hunting and the protector of hunting dogs. (His popularity has given him a prominent position in Europe over the older Saint Eustace whose story dates from Roman days.) As a young man in the 700s, so the legend goes, Hubertus was an avid hunter and tended to overkill. On one Good Friday, a holy day when hunting was prohibited, he couldn't resist chasing a magnificent stag through the Ardennes Forest. He threw his spear and struck the deer in the forehead. The deer turned; the spear had become a shining cross between his antlers and Hubertus heard a voice demanding him to account for his actions. Today Hubertus symbolizes sportsmanship and moderation in hunting. His day, November 3, is celebrated with special hunts.

HUNTING PHILOSOPHY TODAY

When early colonists arrived in our country, they were free from the stifling rules and traditions that had governed their hunting in Europe. They did not feel inclined to limit hunting when game animals were so abundant. Besides, they relied on the wild animals for their food and even for some of their clothing. They also adopted some



German hunters prize the red deer, not only for its beautiful antlers, but for the Grandeln or eye teeth, used in jewelry.

The deer racks are often mounted outside the hunter's house, on carved wood heads. Below, the author is "graduated" from the hunting class after much study.

of the Indians' hunting methods. So in America game regulations have been kept to a minimum.

The modern western European system is a mixture of our new world system and of the total control that existed in the days of the nobles and that is seen today in totalitarian countries.

American and European hunting differ in four main ways:

1. Hunter's Outlook. In the United States hunters enjoy stalking and shooting the game, and we want the best animal possible. Hunting clubs primarily provide better hunting. Getting a hunting license is no problem.

In Germany hunters want to improve the blood lines of the animals, so they pick their prey carefully, always shooting poorer specimens first before they can breed. Hunting club membership provides a German with much social status.

Just getting a hunting license is complicated. First, a German must have a spotless police record. Then he must attend a class three nights a week for nine months; Saturday and Sunday are devoted to his class. Then for two years he must go out with an experienced hunter. After this apprenticeship he takes a two-hour oral exam and a shooting test. If he misses three hares with a shotgun, he must start all over with the course! And besides being highly motivated, he must pay for all of that! For a German, hunting is a privilege.

2. Customs. For us Americans hunting is a way to "get away from it all;" we see ourselves as pioneers again. Hunting is informal. We put on our old clothes and a bright red shirt and take off.

German hunting is formal and is governed by ritual all the way. They have kept the colorful traditions that developed between 800 A.D. and now. A thousand years is hard for us to imagine, but these traditions have passed from generation to generation and are just as important to the German hunter as any of the written laws. For example,

by tradition only green clothes are appropriate for the forest—a shirt, tie, jacket, and slacks or knickers. Brown is a poor substitute, never red, and certainly not phosphorescent orange!

3. Controls. American hunting regulations can function and still be of the minimal variety because we have such a large area. We do have bag limits, but we don't see a warden each time we go out.

Germany is small and must make the most of every inch. The hunter recognizes that he does not have complete freedom on the hunt. In fact, he usually has a forestry official or a guide with him.

4. Economic Considerations. When we shoot an animal in the United States, it is ours, and let's hope our battle against market hunter is over!

But in Germany when you shoot an animal you get only what you pay for—the animal belongs to the man who owns the hunting rights, not you. If you are hunting on private land, your host will normally give you the trophy from your animal. If, however, you are hunting on a state forest, you must pay a trophy fee on every animal that has

horns or antlers. The fee for a top quality red deer stag is 900 German marks; that is equal to about ¾ of the average German's monthly salary, a bit more than $300.

And you never refuse the trophy. German *Jaegers* are proud that they can hunt; they often hang their prized racks outside under the wide eaves of their houses where all can see them. All trophies go to a state trophy show the year they are shot so that the condition of the herds can be studied. The lower jaw is always mounted behind the trophy for aging.

You must also buy the meat if you want it; otherwise, the owner can sell it to the local butcher shop to help defray the cost of managing his hunting area. Germans love venison and cook it wonderfully. Dressed hare can always be found in the town markets.

HUNTING REGULATIONS

The basic German Federal Hunting Law serves as a framework for the regulations of the separate states. Each state can establish specific regulations in consideration of its own geographic and climatic situations and of the game species found within it. The state laws can be stricter than the federal law but not more lenient, functioning much the same as our Migratory Bird Act.

The basic principle of the law is that the hunting rights for all land in West Germany are owned by either:

1. the government (state or federal)
2. cities or corporations
3. private citizens.

These hunting rights and ownership of the game go with ownership of the soil, but they can be leased. Then the leasee holds full responsibility for the game on his area. Back in the days of the nobility, leases often ran for a lifetime; today a small game lease runs for nine years, a big game lease for 12.

No area can be hunted unless it is 200 acres or larger and is managed as a unit. So, often around villages farmers must join their small lands and either lease them as a whole or cooperate in the management.

Taking on a hunting-rights lease or owning your own area is a big responsibility. First, the man is liable for any damage done by his game—rabbit burrows, red deer bark-stripping, or boar and pheasant damage to a neighbor's wine grapes. If the owner does not live in the immediate vicinity of the hunting area he has to hire a trained overseer to control the area. There must be a trained hunting dog to patrol the area. The owner or his keeper have law enforcement powers, too. They can arrest poachers and confiscate their game, weapons, and dogs—and if a poacher refuses to halt, they can shoot him. And they always kill stray cats and dogs.

In the government hunting areas the Forest Service fills the role of the hunting rights owner. These men in green uniforms with acorn insignia are professional to the bone. Besides being hunting guides and game wardens, the foresters also perform the tasks that we associate with foresters here —measuring logs, planting trees, supervising loggers, the works.

Under the law the holder of hunting rights is required to manage and conserve the game so that each species has adequate food and cover and that crop damage is minimal. In our country the aim of wildlife management is to provide game for a large number of hunters through habitat management. But in Germany there can be no more game than forestry and agriculture can tolerate since land is used intensively. The number of hunters is a problem, but they are not taken into consideration in game management.

The basic tool used in this management is the Annual Shooting Plan. A census is the first step in setting up a shooting plan for an area; all of the cloven-hoofed game except the boar, plus the two glamour birds, the capercailzie and the black grouse, are included. (The boar is a gypsy and refuses to be counted!)

After calculating how many young he expects to be born, the owner submits to authorities a planned harvest that will eliminate the normal annual increase. The plan includes the taking of females and young as well as males.

If the authorities feel that the owner is trying to support too many animals on his land, or if his animals did too much crop damage the year before, they can alter his shooting plan. But once the plan is approved, the owner is required to kill that many animals; if he doesn't, the local officials will help.

The shooting plan deals with quality, too. The hunter and the managers work to improve the bodies and trophies of the game. Early in the long open season the inferior specimens are culled. This is a relatively easy job with the male cloven-hoofed animals, but it is difficult to tell which females are going to pass undesirable traits to their offspring. Only after the mating season are the top animals shot.

How can this selective shooting be carried out so efficiently? For two main reasons. First, the forester or owner of the hunting rights knows his herds well from the census and from hours spent in the field observing. Some animals he even names. Also, shooting is done from a stand called a *Hochsitz;* the hunter gains ample time to pick out just the animal he wants to shoot, and the stand provides support for him to aim and get a good shot.

The shooting plan does get complicated at times. If a car kills an animal, it has to be subtracted from the number its owner can harvest that season. And if a deer, for example, shot in one man's area runs to another area to die, matters do get confused!

There is not a shooting plan set up for small game, but they are censused and hunters must spare a brood stock each year to repopulate the area.

To be concluded next month.

North Carolina's Game Lands •

EASTERN SECTION

by Rod Amundson
Photos By The Author

The prime objective of the Wildlife Resources Commission's game lands program is to provide more hunters with more lands where they are free to go whenever the seasons are open and enjoy themselves with no special restrictions or special conditions. Six dollars a year is a small price to pay for hunting and fishing privileges on nearly 2,000,000 acres of well-managed and improved hunting and fishing territory.

The Wildlife Resources Commission and the sportsmen of North Carolina are grateful to the U.S. Forest Service and private land owners for their splendid cooperation in the game lands program.

IF someone tells you to go to Hell and Purgatory, don't blow your top. He may be suggesting that you go to the Wildlife Resources Commission's game lands in Onslow County for some deer hunting this fall. Hell and Purgatory are two tracts of land totalling 717 acres.

The Eastern Game Lands region is located in the Coastal Plains. Altogether there are 664,512 acres under intensive wildlife management. The topography of the region coincides almost exactly with that of the Coastal Plains, and the various areas under management are well distributed throughout.

Habitat ranges from heavily cropped agricultural lands, national forests, river bottom woodlands, commercial pulp and timber tracts, swamps, marshes, and estuarine areas. Game species include deer, bears, foxes, wild turkeys, rabbits, quail, pheasants (stocked experimentally), squirrels, doves, woodcock, marsh hens, and a variety of waterfowl. Furbearers include otter, mink, muskrats, beaver, raccoons, opossums and wildcats. There have been many credible reports of panthers being sighted.

Eastern Games Lands consist of the following:
Angola Bay Game Land
Big Pocosin Game Land
Carter Game Land
Croatan National Forest Game Land
Dare Game Land
Dismal Swamp Game Land
Lake Mattamuskeet
Lukens Island Game Land
Northwest River Game Land
Orton Waterfowl Refuge
Penderlea Game Land
Scuppernong Game Land
Swan Lake Game Land
North River Game Land
Spruill's Farm Game Land
Catfish Lake Game Land
Eagle Island Game Land
Goose Creek Game Land
Gull Rock Game Land
Hell and Purgatory Game Land
Hofmann Game Land
Holly Shelter Game Land
Jarrett Bay Game Land
Tuscarora Game Land
White Oak River Impoundment Game Land
Bull Bay Bear Sanctuary
Green Swamp Bear Sanctuary
J and W Bear Sanctuary
Simmons Bay-White Marsh Bear Sanctuary
Suggs Mill Pond Bear Sanctuary
Scranton Bear Sanctuary

The development work carried on in the Eastern Game Lands is under the supervision of Grady L. Barnes, a long-time Wildlife Commission employee with an excellent background of biological training and experience. Serving under Barnes' supervision are four mobile work crews. These are:

Columbia Development Crew, L. B. Tunnell, leader; Earl B. Gillis and Brian D. Hyder, assistants.

New Bern Development Crew, Stephen A. Thomas, leader; Asa E. Shreve, III and Harold T. Hill, assistants.

New Bern Engineering Crew, Elton M. Quidley, leader; William R. Callow and Allen F. Olmstead, assistants.

Holly Shelter Development Crew, Ashley Manning, leader; Kenneth Raper and Lanny Hollowell, assistants.

As in the case of the other three game lands areas, one of the first tasks under the new program was marking hundreds of miles of boundaries, and more marking will be needed as more lands are acquired.

In wooded areas large clearings have been made to provide grazing areas for deer, nesting areas for quail and feeding areas for wild turkeys. These are usually planted to fescue and ladino clover, sericea and shrub lespedeza. Others are planted to strips of millet and other foods attractive to doves.

The U. S. Forest Service uses the clear-cutting practice in small tracts of woodlands. This stimulates an abundance of growth that provides browse for deer.

Continuous but periodical jobs consist of road building and maintenance, installation of culverts and small bridges, fire lanes, and building dikes and canals for waterfowl impoundments.

Unique to the Eastern Game Lands is the development of 1,735 acres of waterfowl impoundments. In salt marshes near the coastal sounds marsh mos-

Large clearings have been planted in various wildlife foods, such as this shrub lespedeza. Vegetation which serves as nesting areas for small game is also grown.

The development of impoundments for waterfowl is an important facet of the eastern game lands program. Natural waters and flooded sites serve as feeding and resting areas.

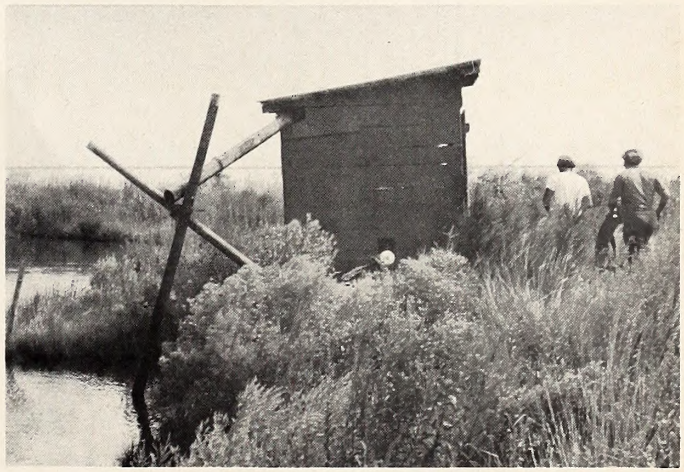
quitos have long been a nuisance. Marsh mosquitos are unique, in that they breed in mud rather than water. The health department built miles of dikes and canals around these marshes so they could be flooded for mosquito control. The Wildlife Resources Commission cooperated in these projects, and now uses portable or stationary pumps to keep the marshes flooded with shallow water the year round. This promotes the growth of natural waterfowl foods, and these attract thousands of ducks during the fall and winter. More of these impoundments are planned.

All of the impoundments are open to waterfowl hunting each year on a come-one-come-all basis. A game lands use permit is required in addition to a regular hunting license and waterfowl stamp. Waterfowl hunting on the impoundments is a do-it-yourself proposition. Hunters must furnish their own equipment.

These impoundments also provide a bonus for fishermen. The canals and channels around them are loaded with largemouth bass and panfish. Some of the impoundments themselves provide good fishing, and the more brackish ones produce an abundance of blue crabs—free for the taking.

Although wildlife habitat development and improvement are major objectives in the game lands program, other activities are necessary. Over 1,200 miles of boundaries have been marked with metal signs or paint. Forest clearings must be mowed periodically, new roads and trails built, and equipment kept in efficient operating condition.

The people who do the work of habitat improvement on game lands are well-trained, enthusiastic and energetic. They know they are doing work that will benefit all forms of wildlife—and equally important—benefit people. This is why they put in long hours of hard work, and get a great deal of satisfaction from doing so. ⬍⬍



Pamlico Point waterfowl impoundment is maintained by a series of pumping stations (above) and water control dikes. Doves are attracted to plantings of millet made in strips near open fields.

How to Plant Ducks

by James H. Griffin
USDA-Soil Conservation Service
Photos By The Author

"I want to use this field for ducks," decided Joseph B. Rose, Sr., of Kinston as he described an area on his farm. Rose had come to the Soil Conservation Service Field Office in Smithfield seeking assistance to drain a wet field located on his farm in the Bentonville Township in Johnston County. His initial plans had been to drain and plant the field in row crops.

But following a discussion on the conservation program of the Johnston Soil and Water Conservation District, Rose decided that he would like to develop a resource conservation plan for his farm. He signed an agreement with the District providing for technical assistance in developing this plan, and began to think in terms of ducks instead of "crops."

Although the duck field possibility was still just an idea with him when he left the office that day, he had indicated that he loved wildlife and would like to explore this possibility further.

On a cold and rainy day in December 1971, Rose, SCS Biologist Phil Edwards and I met to look over the "wet field" on Mr. Rose's farm. The purpose of this trip was to determine the suitability of the site for development as a duck pond. The essential requirements—a good soil for crop production and water holding capacity and a dependable water supply—appeared to be present. Edwards told Rose that his site looked good and had good potential for development as a wildlife habitat area.

Later, Charlie Woodhouse, game biologist for the North Carolina Wildlife Resources Commission, looked at Rose's prospective duck pond location. He, too, liked the site and thought it had good potential. Then Joel Cawthorne, SCS Soil Scientist, made a soil survey of the farm and determined that the soils in the wet field would be suitable for constructing a duck pond. With these facts and recommendations in mind, Rose made the decision to develop the pond and what had originally started as a drainage project became a wetland wildlife habitat development instead.

Following this decision to proceed, engineering surveys were made to determine what practices would be needed to provide adequate drainage and to provide for the required water management. Then, Rose began the necessary construction. The existing canal through the center of the field was re-routed around the edge. In doing this, the spoil was placed on the inside of the ditch to serve as a dike to hold water in the field. The old ditch was left intact, to be used to

An engineering survey should precede construction of the proposed duck field. Professional advice will determine the feasibility of the project.

Joel W. Cawthorn, SCS Soil Scientist, examines a soil sample taken from the proposed site. This is another important step in insuring success of a duck field. Above, Charlie Woodhouse, Wildlife Commission Biologist, inspects the flood gate as this field fills.

bring water into the field for flooding in the fall. Water control structures were placed on the ditches so that water could be diverted into the pond. A six-foot high dam, complete with a water control structure, was constructed across the lower end of the pond.

The next step was to plant food to attract the ducks. Japanese millet was planted in July 1971 upon completion of the project. This was then flooded for the first time in October of that year.

In February 1972, Woodhouse supplied 50 sawtooth oaks which were planted around the edge of the field to supply acorns. Karl Graetz, SCS Plant Materials Specialist, supplied enough Chiwapa millet and baldwin junglerice for about an acre planting, and Rose added about five acres of corn. Approximately one acre was allowed to grow up in native weeds. This combination of plants provided a diverse food supply when the field was flooded again in mid-November of 1972.

Charlie Woodhouse and I conducted a survey March 1973 to determine utilization of the corn by the ducks. We found that about 90 percent had been eaten and that there were very few full ears left in the field. It was apparent that the muskrats and raccoons had eaten some of the corn, but the ducks had gotten most of it. Rose has been happy with the success of his duck pond and has spent several days in his trailer on the farm watching his ducks.

"It has been worth every penny I've spent,'" he says. "I have always loved ducks but I never thought of having them on my farm until that day in your office. I was only thinking of draining that field so I could harvest my crops. Now, the ducks harvest it for me."

This duck field is now growing corn for ducks, muskrats and raccoons to harvest this winter. As for the rest of the resources conservation plan, Mr. Rose says it too, is being carried out. An eroded area beside another of his ponds has been established in shrub lespedeza and fescue. Duck boxes have been erected in this pond, too. An excavated pond has been added since the conservation plan was prepared. There is shrub lespedeza and fescue planted around it for upland wildlife uses. The shrub lespedeza plants were furnished by the Wildlife Resources Commission.

Rose says "It's a good feeling to plan and apply a good conservation program on your land. I enjoyed planning it, but I have enjoyed the results even more."

The duck field is flooded and ready for the waterfowl. Corn is partially submerged at left. A flight of ducks appears over the flooded field to "harvest" the mature corn (right).

PHOTO BY LUTHER PARTIN

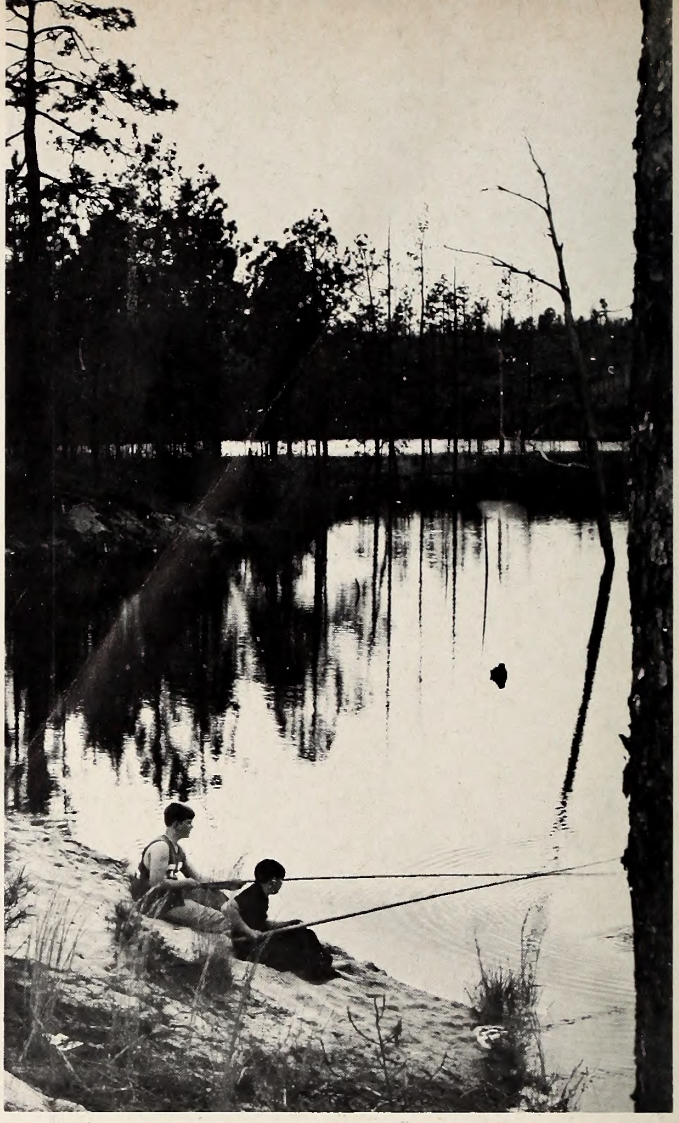


PHOTO BY TOM ROLLINS

Toward Better Wildlife Regulations

By Jim Dean

Good Wildlife Regulations Start With Good Ideas.
Maybe You've Got One That Could Make the Grade.

THERE probably isn't a hunter or fisherman in North Carolina who hasn't at one time or another, thought of a regulation he'd like to see passed. Many of the ideas are serious. "Boy, I'd sure like to see some regulations passed to protect the black bears in this state," somebody once said, and now there are more than two dozen bear sanctuaries in the state.

Some are funny. "Why in blazes don't they pass a law making doves fly slow and low?" somebody else might complain.

Such ideas—some serious and some not so serious—are tossed around among hunters and fishermen almost everytime they get together. But that's about as far as most ideas get because many sportsmen don't realize that they can personally play a big part in the formulation of good game, fish and boating laws.

Of course, many ideas for regulations come from field biologists and other Wildlife Commission personnel, but not all by any means.

"Some of our best and most effective regulations have come from hunters and fishermen who merely took the time to write us and pass along a notion," says Don Baker, chief of the Division of Inland Fisheries. "We'd like to get more suggestions for regulations."

In most cases, a simple letter outlining the suggestion and giving reasons for it is all that is needed. But, of course, that doesn't mean that the regulation will necessarily be adopted by the Commission. What it means is that it will be given

THE PURPOSE OF REGULATION is to provide More Sport For More People — and to give Equal Opportunity for All

strong consideration along with all the other suggestions. Of all the suggestions considered each year—including those offered by professional biologists and wildlife protectors—only about one percent ever get into the regulation booklet. But all get a careful review.

Many sportsmen are not aware of the procedure that transforms an "idea" into an actual regulation.

Here's how it works. Although the procedure is essentially the same for all ideas, let's follow a suggested regulation through Don Baker's Division of Inland Fisheries. The same general procedure is followed by the Game Division and other divisions for hunting regulations.

Ideas and suggestions are accumulated throughout the year. They may come from biologists, from a sportsman's letter or from sportsmen's clubs. All ideas are filed and considered under a carefully arranged schedule.

Beginning in July or August of each year, fisheries personnel meet with the Division of Protection to collect suggested changes in regulations from the many wildlife protectors. Also, towards the end of August, suggestions from field personnel in the Division of Inland Fisheries are collected in the Raleigh Office.

Then, along about the first of September, there's a big meeting of fisheries supervisors and biologists, and all ideas received up until that time—including your suggestion, if you've written a letter offering one—are carefully considered.

"The attrition rate of ideas at this meeting is terrific," says Baker. "We've usually got hundreds of ideas, and only a relatively small percentage are really judged worthwhile or practical after we've finished hashing out their pros and cons.

"Generally speaking, there are several common reasons why a suggested regulation might be passed over at this September meeting," says Baker. "In many cases, people are not fully aware of the biological problems surrounding a regulation. For example, a suggestion to lower the size limit of a certain species of fish may be considered, but studies may show that if this size limit is lowered, the fish will be caught and kept before they've had time to spawn, and that could eventually hurt some good fishing. This is the most common reason for rejecting an idea. It just isn't best for the resource.

"Another reason we may reject an idea is because it may prove difficult, if not impossible, to enforce," says Don. "How, for instance, could you enforce a regulation that prohibits the taking of female striped bass? Not even a biologist can always tell the difference between a male or female until the fish is cut open."

"In some cases, suggestions for regulations serve interests that are too narrow," continues Don. "Sometimes, a regulation is suggested that would provide sport for only a few people at the expense of a great number of others. Unless there are strong biological reasons for doing this—such as protecting a limited resource—we usually reject such suggestions.

After the fisheries supervisors and biologists have reviewed all the suggested changes in regulations at the annual meeting early in September, the ideas that have not been scrapped are taken to the nine-member board of Wildlife Commissioners sometime late in September. Once again, the ideas are carefully reviewed, this time by the appointed Commissioners who represent the public's interest. The suggested changes in regulations that survive this careful scrutiny are then publicized so that the public will know the changes in regulations the Wildlife Commission will propose at its public hearings.

Then, the proposed changes in regulations go to the public at hearings held across the state (nine hearings are held for game regulations, and three for fish regulations). At these meetings, sportsmen are given a chance to comment on the proposed changes or present new ones.

After the hearings, the board of Wildlife Commissioners and the professional staff of the Commission again review the proposed changes. If some of the changes have been unpopular at the public hearings, and if there are no overriding biological reasons for them, they will undergo further change. Some may be dropped completely, others may be added.

After undergoing final consideration, the Wildlife Commission meets—usually in late October—and officially adopts those changes in regulations that have survived. In November, the regulations are rushed to the printers, and by December, they are in the hands of sportsmen. On January 1, they become effective.

It is a long and involved process, but necessarily so. Regulations affect a lot of people and have considerable effect on wildlife resources. The process of careful review by many parties throughout the year insures that only the best conceived regulations ever become effective.

But all regulations have the same common origin. They start with an idea. And your ideas, expressed in a letter to the North Carolina Wildlife Resources Commission, 325 N. Salisbury Street, Raleigh, North Carolina 27611 may be among the best anyone has ever thought of.

So, if you have a suggestion for a new regulation on "fishing, hunting, trapping or boating," or want to see an old one changed, drop us a letter. We'd like to hear from you. ⬍⬍

Safer Hunting Through Training

PH
BY

• The Wildlife Commission now has a full-time hunter safety program made possible with funds received from the federal excise tax on handguns. The program is administered by C. J. Overton, Jr., Assistant Chief of the Division of Protection. Three Hunter Safety Officers, Wilton Pate of Ayden, Richard Jarrett of Haw River and Lyle Morgan of Marion, round out the professional staff.

Their objective is to provide training for anyone, young and old alike, interested in hunter safety. The number of people desiring this service has created a demand far beyond the capabilities of the three-man staff. Consequently, much of the face-to-face instruction is provided by volunteer Hunter Safety Instructors. They are trained and certified by a Hunter Safety Officer and supplied with the instructional materials needed to teach an accredited hunter safety course. Almost 11,000 students received training this year and Overton has set a goal of 22,000 for 1974.

Summer camps are cooperating with the Wildlife Commission in providing this type of instruction to a growing number of young people from our own state and many parts of the country. Some other states require that the Hunter Safety course be completed before a hunting license can be issued to an individual. The course administered by the Commission meets the requirements of the law in all these states.

The need for training in gun handling and hunting ethics is well demonstrated by the number of firearms found in the average home. It is important for the non-hunter and even people who do not normally handle guns to know something about gun safety, since tragic accidents occur in the home as a result of careless handling or improper storage.

An attentive group of young hunters watch Hunter S
B. Pate and Volunteer Instructor Jim Hale (right) der
of two basic firearm types.

Various types of ammunition are shown to a class
a summer camp (left). The power and effects of th
ammunition are demonstrated in live firing on an a
proved range under careful supervision of Pate an
Volunteer Instructor Wes Perry at right.

FEATURE
THER PARTIN

Officer Wilton
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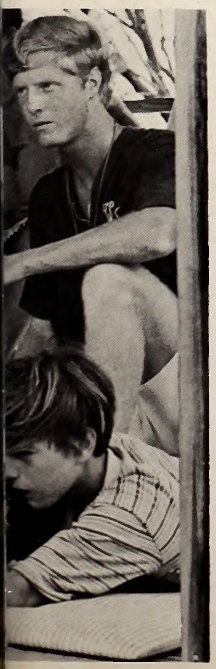
The proper way to carry a gun while hunting in a group is taught under field conditions. Watch that muzzle, cautions Instructor Perry.

The growing popularity of bow hunting is indicated by a session on safe handling of bow and arrow during the course. Instructors are Tommy Thompson (dark shirt at left) and Don Hughes, right.



Stance, lead of target, and accuracy are reviewed on the skeet field. Successful graduates of the course earn the Hunter Safety shoulder patch (above) and will be safer hunters.

Wetland Habitat Management

by Phil Edwards
USDA-Soil Conservation Service

ALL PHOTOS U.S.D.A. SOIL CONSERVATION SERVICES

An example of existing wetlands in need of preservation is this eastern North Carolina bottomland cypress swamp. These are important wildlife habitat areas and must be saved and managed.

DURING the past few years, the use and management of wetland areas as habitat for wildlife has become an important aspect of land use planning. Attention has been focused on the need to manage such lands as wetland habitat rather than draining the areas. The Soil Conservation Service, working through local soil and water conservation districts, has assumed an active role in providing landowners with planning assistance on the proper use of wetlands. The Service has established guidelines for providing this technical assistance plus providing leadership to work with interested landowner groups. It has also initiated programs to solve difficult technical problems associated with management of wetlands for wildlife.

The basic standard which the Soil Conservation Service has established for wildlife wetland habitat management is as follows:

Definition — Retaining, creating, or managing wetland habitat for wildlife.

Purpose — To keep, make or improve habitat for waterfowl, furbearers or other wildlife.

Where Applicable — On existing wetlands or on land which can be developed as wetland habitat by ditching, diking and flooding.

During the periods of July 1, 1971, to June 30, 1972, approximately 6,450 acres were planned for wetland habitat management and conservation measures were applied according to carefully planned specifications. These developments have been installed in at least 28 North Carolina counties; this represents a significant commitment of land to wetland wildlife habitat.

In order to implement the basic principles described above, training programs are conducted for Service personnel on the proper use and management of wetlands. In addition, we work with landowner groups to stress the importance of wetland planning.

An example of this is a recent trip planned for landowners from Hyde, Currituck, Tyrrell, and Camden counties to observe the goose management programs being carried out on the Delmarva peninsula. The knowledge and experience gained by landowners who participated in this tour should serve as a basis for local support of a long-range waterfowl management plan in North Carolina. The basic objective of these training programs is to implement "on the land" the three basics of our original definition —i.e., retaining, creating, and managing wetland habitat.

The *retention* or preservation of existing wetlands in North Carolina is of primary importance in any long-range wetland management plan. Examples of areas of importance that need to be preserved in their natural state are salt marshes, wooded swamps and seasonally flooded bottomlands. Preserving areas of these types represents a most significant trend on the part of landowners today. Many recent soil and water resource conservation plans include provisions for lands to be retained in their natural state because of their value as wetland wildlife habitat. This trend is especially significant when we consider that most of the valuable wetland habitat in North Carolina is in private rather than public ownership.

The next item in our definition is that of *creating* wetland habitat. This normally takes the form of "duck field" development and is quite popular and successful from the upper piedmont to the coastal plains. (See page 10). Many landowners believe that duck fields must be developed in remote wooded locations. On the contrary, most often the best location for this type of operation is on the better soil of a farm. A good soil, a dependable water supply, and a reliable

water control system are basic essentials to a successful duck field. Soils must be suited for crop production, including fertilization and sufficient internal drainage to permit normal farming operations. Crops most frequently grown for ducks are Chiwapa millet, baldwin junglerice, browntop millet and corn. Of course, another important prerequisite for a successful duck field development is a dependable supply of water to flood the field during the late fall. This water normally comes from ponds or streams near the field.

In addition to ducks, several other wildlife species such as herons, egrets, muskrat, raccoon, and mink are frequent visitors to duck ponds. The grain crops provide an abundant food supply for many of these visitors.

Duck fields have been planned and installed in many counties throughout North Carolina. They range in size from large 25-acre fields to the small one-acre fields. An interesting observation about these developments has been the protection from overhunting that they have received. In fact, many landowners develop duck fields solely for the purpose of observing waterfowl, and hunting is not allowed.

The last category in our definition of wetland habitat management is that of managing *existing wetland areas*. The basic objective of this is to improve the value of existing wetlands by such practices as food plantings or water manipulations.

Beaver ponds are interesting examples of how the value of existing wetlands can be improved by management. By lowering the water level in the spring, and seeding exposed areas to plants adapted to extremely wet soil conditions, the food supply for waterfowl often can be greatly increased. And these practices do not disturb the beaver populations. The beaver dam is partially broken and the water level is maintained at a sufficient height that the beavers do not abandon the pond. In the fall the beavers are allowed to repair the dam thereby raising the water level and reflooding that area which was planted for duck foods the previous spring.

Other practices for managing wetlands include lowering water levels in farm ponds to expose shorelines thereby encouraging native food plants (consistent with fishing operations); and construction of duck nesting boxes on ponds and in heavily logged swamp areas.

In working with landowners on wetland habitat management, continuing problems have been encountered in obtaining specific plants for specific site requirements. To meet these needs, the Soil Conservation Service has an active plant materials program. The purpose of this program is to test, select, and increase useful conservation plants. Plants that have been selected for wetland habitat food plantings include browntop millet, baldwin junglerice, and Chiwapa millet. As an item of interest, other wildlife food plants which have been selected, tested, and increased in Service plant materials centers include autumn olive, clanton tickclover, wild reseeding soybeans, bicolor lespedeza, japonica lespedeza, thornby cowpea, ricebeans, and dove proso millet.

Wetland wildlife habitat management on private lands is becoming increasingly important in North Carolina. Landowners are becoming more and more aware of the need to plan for the proper use of their lands for wildlife and the Soil Conservation Service is working closely with these landowners to provide the necessary technical assistance for proper wetland habitat management. ⬍⬍

Waterfowl, even in the Piedmont, will come in to good food and water situations. This is a Lincoln County duck pond with some visiting mallards (left). Beaver ponds, surprisingly numerous over the state, can also be improved for ducks.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Salt Water Fly Rodders Meet

The eighth annual Master Fly Casters Get Together is scheduled for Nags Head October 19 through the 22nd. Headquarters will be the Holiday Inn, Kill Devil Hills, N. C. If you're interested in attending, contact Braxton Flye, Box 26808, Raleigh, N. C. 27611.

Wildlife Volumes to State Library

Two new books, "The World of the Gray Squirrel" and "The World of the Wood Duck," were presented by their respective authors, Dr. Fred Barkalow and Jack Dermid, to the State Library last month. Lt. Gov. Jim Hunt accepted the books for the State.

Last Call For Fishing Regulation Hearings

The 1974 Fishing Regulations will be the subject at a series of public hearings set for 7:30 p.m. at the following locations:

October 8, 1973	Asheville	Buncombe County Courthouse
October 10, 1973	Salisbury	Rowan County Courthouse
October 11, 1973	Washington	Beaufort County Courthouse

Wildlife At The Fair

All the wildlife at the State Fair won't be on the midway! The Wildlife Commission will have its exhibit area well stocked with deer, waterfowl and small game as well as plenty of native fish in giant glass-fronted tanks. October 12-20; we'll be looking for you.

Wildlife Artists Attention

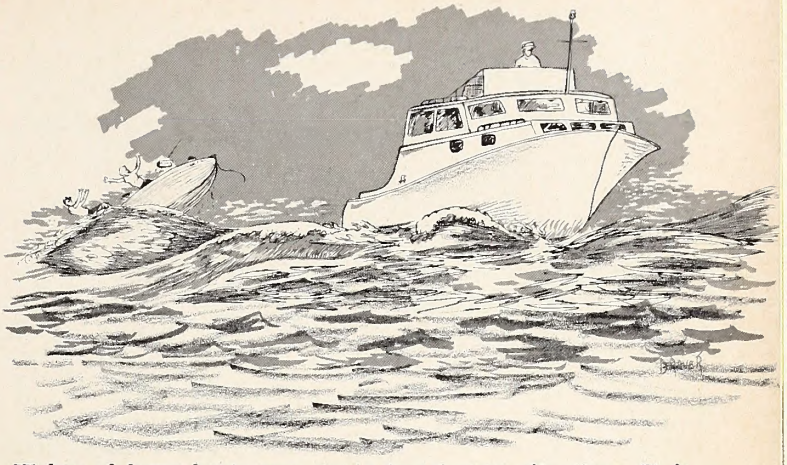
Plans are underway for the annual Wildlife Art Exhibit sponsored by the Wake County Wildlife and Sportsman's Club. Artists interested in exhibiting works at this November 29-December 1 event should contact Rick Crumpler, 2209 Brewer Street, Raleigh, N. C. 27608 for entry information.

"All-American Bass Casters"

North Carolina anglers may wish to write the above newly-formed national fishing club at 6 Churchill Road, Chelmsford, Mass. 01824. One of the club's themes is "Don't kill your catch."

Stern to Stern

BY ED JENKINS



Wakes of large boats can create treacherous situations. It is the responsibility of the skipper of any craft to operate it in such a manner that his boat doesn't endanger others.

IT was a beautiful day for fishing at Oregon Inlet. The sun was shining, a light northeast breeze blowing, and plenty of obliging flounder almost anywhere a strip of squid was dropped. Our 15-foot runabout was ideal for fishing on a calm day like this, and the current and light wind were drifting us over some mighty productive flounder areas. Everything was fine—except for one thing.

The first thing I noticed about the distant boat was the way the bow seemed to point straight up in the air, and then there was the muted throbbing roar of the diesel engines, and behind it that awesome wake.

"He will miss us, won't he?" my wife Gail asked.

"Yeah, he'll miss us, but if he keeps coming as he is now, his wake won't" I replied trying to sound as calm as possible.

He was about 300 yards away now and closing fast. I could pick out the figure of a man on the flying bridge, but I couldn't keep my eyes off the monstrous wake the boat was throwing up. "If he keeps coming, he'll pass about 20 feet off our stern, and sink us for sure," I thought to myself not wanting to upset my wife anymore. "Reel in your line" I said as I made my move for the controls. "Motor, if you ever start, let it be now" I thought as I turned the ignition key. Now I've been to two county talent shows and a hog-calling in my life, but I don't think I've ever heard anything quite as pretty as when that Merc fired up!

After we got our lines reeled in and in the boat, we began yelling and gesturing to the man in the other boat to slow down. It was then when I noticed one of the gestures my wife was making to the operator of the other boat. I hadn't seen it used since I was in the Navy, and it was anything but flattering then.

"Where'd you learn that?" I asked.

"What?" she shouted over the noise of the engines.

"Never mind," I replied. "Let's get out of here before his wake hits us."

I shoved the controls forward, and we went about a hundred yards before I slowed the boat down and turned the bow of our boat into the oncoming wake. The waves were still about five-feet high when they hit us. The bow of our boat rode over the first one then slammed down into the trough between the first and second wave. Even though I knew it would come, the jolt and the loud "wham" the fiberglass hull made when it hit the water startled me, and my grip grew tight on the steering wheel. Behind us our fishing rods clashed together and against the boat, and the gas tank made a sharp "ping" as we made contact with the water. My wife was pushing herself off of the console back into her seat where she was jarred from the instant before. The look on her face was one which I had rarely seen. It was a look of fear and uncertainty, and for a split second I could feel the anger burning inside of me.

"You've got no right to make her feel this way" I felt like screaming at the man on the flying bridge. I wanted to look around to check on the gear behind us, but I realized there was nothing I could do—the second wave was now upon us. Before the boat could rise up again over the second wave, the wave broke over the bow sending a rushing green wave of water into and over the windshield. Again the boat slammed down into the trough, but not near as severe this time as the first. The third wave was much easier and soon all was calm again as we watched the man on the flying bridge look back at us. He had never paid any attention to our pleas or slowed the engines even one revolution, and the wake behind the large boat now completely obscured the name on the stern of his boat.

"Do you reckon he just didn't care if he sunk us or not?" Gail asked and then added, "What would we have done if our motor didn't start?"

"Put on a life jacket and hoped that I could have gotten off a shot at him with a pop bottle before his wake sank us!" I replied still bitter from our encounter.

"Well," my wife said, "It's a shame that a man who has enough money to have a boat like that doesn't have enough sense to operate it."

"Amen."

TEXASGULF — Six Years Later

conclusion

By Charlotte Hilton Green

This concludes the story of Texasgulf's North Carolina operation as seen by one observer.

• Last month we examined many of Texasgulf's activities in the Aurora area and how these operations affected us in the Tarheel State. We were talking about the forestry practices and the raising of beef on reclaimed lands.

And wherein comes the relationship between *TG's* cattle and trees? We know of the practice of large western ranchers renting National Forests' grazing land. A good two-way use—*if not abused.* But, there is constant contention from conservationists that too often too much such grazing *is* detrimental to the forests.

Here again *TG* is experimenting. Of the thousands of acres purchased, some already cleared, were planted to Bermuda, as explained. Others were planted in trees . . . by now over 1,800 acres have been set. And some, already in trees, were in need of scientific forestry.

"Get rid of the 'weed trees', diseased trees, crooked trees. This gives the good trees a better chance to grow."

In some of the forest tracts trees are ready to cut at a certain age for the ever-growing demand for pulpwood. Removing these pulpwood trees when they are ready, gives the better trees more sunlight, thus quicker growth, for the also growing demand for timber.

(I've heard that "Every issue of a Sunday edition of *The New York Times* takes 11 million trees." That seemed prohibitive, so I called Forestry Division, *NCSU,* and Professor W. T. Huxster tried to estimate it, considering weight of single issue *Sunday Times,* estimated number, size of trees (8-inch diameter, 5-6 feet high to make a cord)—and arrived at possible figure 33,790 trees. Which figure is nearer right?)

Most of the trees planted in *TG's* forestry program are loblolly pine (*Pinus taeda*) and tulip poplar (*Liriodendron tulipifera*) which isn't a poplar, but belongs to the *Magnoliaceae* (Magnolia Family.)

And cattle and trees? In some of the areas, cattle pasturage is next to its forests. In summer, during the heat of the day, cattle like to go in under the shade—and in winter, out of storms and extreme cold.

"In general," says Hayes Gregory, "if done under strict supervision, it can be helpful to both cattle and trees, the grazing can keep down the weed growth. We plan this in 100-acre plots, averaging ten cows to the acre. Any more would cut and pack the soil too much."

Aurora — the Town — and the School

Aurora is the town connected with *TG.* A growing town, and the town where David Edmiston, Manager of Phosphate Operations makes his home; where his children attend its school, where he participates in school, church, civic affairs, has served on *PTA.* Aurora and the plant of *TG* are closely connected. Through Mr. Edmiston *TG* has helped with the school band, with its tennis courts, and other affairs. Some of its students have summer jobs at the plant. Upon graduation, some go into the plant on regular jobs.

We visited the school. Unfortunately, the principal, Kirby Wynne (white) was out with flu, but we had a good visit with assistant-principal George Comegys (black) and Mrs. Mary Peele, Science teacher and guidance counsellor. Integrated, it is about 67% black, but relations, I was told, were kept fairly good.

Understandingly, all this giant *TG* activity has brought economic benefits (as well as some criticisms) to the area: formerly a land of low income from farming and fishing, it is now prosperous. *TG* pays good salaries, and more than 90% of its 700 employees are native Tar Heels. Other communities in the Pamlico Sound area feel it, too, and its commerce is a part in making nearby Morehead City a major port.

"Two cooperative educational programs have been actively pursued by *TG's* phosphate operations with *NCSU,* East Carolina University and

with surrounding county technical institutes. The program with *NCSU* and *ECU* is part of the undergraduate degree program and involves students working at *TG* six months, then taking six months of classroom work on an alternating basis during their sophomore and junior years.

The program of on-the-job training in the industrial arts conducted in cooperation with the technical institutes has similar goals and gives the student an opportunity to work at his trade prior to graduation. The student works at *TG* for three months on two occasions during his two-year academic program.

TG has no unions. Why? When today unions play such important roles in labor-industry? No unions? Is that good or bad? Certainly unions have done much for the worker, played a great role. One looks back on the days when there were none, and labor was exploited by the Giant Moguls of expanding industry. Low wages and no income tax! No wonder they piled up immense fortunes!

Good Pay and Fringe Benefits, is *TG's* method. *TG* has good hospitalization programs, sick leave, vacation programs, pensions.

Annual Picnic

And now let's attend that annual picnic, which *TG* puts on for its workers and their families, in September, when vacations are over and children back for school.

Barbecue! Of course, it's beef barbecue! Isn't one of their side projects the raising of beef cattle? Both on the "before and after" mining land?

The company buys the beef (their own cattle are "conditioned" first as are all beef cattle); 2,500 pounds, and 24 hours required for proper barbecuing, the chefs kept busy all night turning and basteing the meat and supplying fresh coals. UM . . . one can almost smell that tantalizing odor—plus slaw, baked beans, potato salad, chips, pickles, breads, soft drinks, coffee. Calories are forgotten. Never mind what the scales say tomorrow!

The "Big Brass" do all the work, each supervisor having a job, while the workers and their families —all ages, all colors—enjoy watching someone else. For the youngsters there is also cotton-candy making machine, bubble gum, popcorn, balloons—and last year Smoky Bear with a display on forest fire protection. And at eventide, fireworks.

During the day all kinds of games are played; there is a band, volleyball, horseshoes, soft-ball, putt-putt golf, track races. Awards are presented the winners of each contest.

Lakes and Marshes

Of course, when an area is mined, though most of the remaining residue is recycled and used as fill for the open pits, we must face the fact that there will be less land and more water. Probably a fresh-water lake and several fresh-water marshes . . . which should attract birds and wildlife. The lake will be stocked with fish. Fishing will be allowed by the workers.

In the booklet "Marsh Building with Dredge Soil in North Carolina" by Drs. W. W. Woodhouse, E. D. Seneca and S. W. Broome of *NCSU,* it is pointed out: "The value of tidal marsh shoreline protection and as a nursery-ground and source of energy for a high proportion of our commercial and sports fishery species has become widely recognized through the years."

Thus the stabilization of dredge soil and the establishment of new marshes seem on the right side of the ledger.

This Then — My Story

This then, is the story of *TEXASGULF* in Eastern North Carolina as I have seen it, read, heard, and talked about it—and tried to understand. Is it good or bad for the region? Opinions vary. Most of the local people seem to be for it. An acquaintance —who had read my columns, had this to say: "I grew up in that country. I know how poor it was. *Texasgulf* has given employment, pays good wages, has a good vacation plan, hospitalization and pension plans. It has helped the community and strives to do as little damage as possible, and restore as far as possible. I feel you have presented a fair picture."

A local resident, a conservationist: "I was one of two people near here who knew that the immediate danger was the appearance of salt water. Up to date it has not appeared—and a constant check is being made by both industry and the state . . . We have no fumes, no smoke . . . they have not harmed our river that I can see. Occasionally we get a terrible odor, then realize it was not *Texasgulf,* but the pulp plant near New Bern. . . . The only people who really resent *Texasgulf* are those who used to hire help at starvation wages and can no longer do so."

But, some of the environmentalists are still apprehensive . . .

According to Dr. Frederick S. Barkalow, Jr. Dept. Zoology and Forestry, *NCSU,* there is criticism over the dry pit mining technique—which has already lowered the water table—instead of dredging, as was originally planned. Dry pit uses much more water, means ultimate damage to the aquifer by pumping.

Another problem is re the State having granted an option to mine under Pamlico River, which could have a tremendous detrimental effect on the river. As of now, *TG* has not done this, but the State is still accepting token payments re this grant.

The "slime pit" is yet another worry to strict environmentalists: "If, through erosion, or as a result of hurricane (and eastern North Carolina is in the hurricane belt) the retaining walls of the 650-acre slime pond should be breached, the overflowing slime could mean massive pollution in the river."

And so . . . . does the good offset any damage . . . or possible damage? ⬍⬍

FOR THE HUNTER

by Edwin L. Pearce

What does it take to make your deer hunt "pay off" with a nice buck? Well, plenty of good fortune for one thing, but "knowing your deer adversary" can spell the difference between success and just another hunt.

THE cardinal rule in any type of competition is to know your adversary. Fighters go to great lengths in studying the style of their opponents, they view films of his previous fights, talk to his sparring partners and those who have previously fought him —all in an attempt to locate his strengths and weaknesses. Baseball batters and pitchers constantly go over each other's moves and try to steal signs in order to gain an advantage that could spell victory or defeat. Football teams and players never stop trying to pattern the other's reactions to specific plays and to come up with their own surprise play that would produce a touchdown.

Hunting deer is undoubtedly one of the greatest of competitive sports. The hunter starts at a distinct disadvantage, for he must first find (or hunt for) his adversary. Many times, this in itself presents a big problem for you're playing in the deer's backyard and he has all the advantages attributed to the home court. Not only must you find him, but you must see him before he smells, hears or sees you or you'll have little chance to get within shooting range. All of this points to the fact that, in hunting deer, it's a must that you learn all you can about the deer if you're to be successful. It's a matching of skills, as is any competitive sport.

The average hunter usually takes advice from those more experienced, but he makes countless mistakes before he learns from his own experiences what he can and can't do, and gradually builds his own particular style of hunting which leads to success.

In learning all he can about the deer, he should pick up the following pointers:

Wild animals are just that—wild. What they do at all times is dictated by a most powerful force, the instinct to survive. From their infancy, they learn these survival tactics from those of their kind who HAVE SURVIVED; what and when to eat, what and when to drink, who their enemies are and what they do. As they mature, they develop their instincts to a high degree, as witnessed by the big-antlered buck who hides his rack in tree branches, or sits motionless in his bed as you pass close by. He seems to always know when to run and when to hide; his life depends on it. It's said that an old buck never took a chance or a risk he could avoid, and that's why he's an old buck.

But, he's not perfect. The hunter must capitalize on his shortcomings and weaknesses if he's to be successful.

SIGHT

The deer's keen sight—estimated range from three-to-six-times as keen as your own sight—is one of his greatest assets and is geared to movement. But he can't readily distinguish a still object unless it's outlined against a lighter background. Concealed in a blind, I've had old bucks browse to within 30 feet of me.

Take advantage of this sight failure. If you're still hunting, be sure you have a broken and dark background and avoid movement of any kind. Particularly watch your head and hands, they usually move first and the most. Move your eyes, not your head. Don't shuffle your feet and don't chew gum. Keep your gun pointing forward and at elbow height. If you must move, do so as slowly as possible. Remember, with his keen eyesight geared to movement, he'll pick up your slightest movement. He's not looking for enemies from above. Where the law allows, use a high seat in a tree for still hunting, but continue to remain as motionless as possible.

SMELL

The deer's sense of smell is governed almost entirely by the wind. When he moves, it's into the wind. He is also especially sensitive to strange odors.

Be sure your hunting clothes have been aired. Musty, mildewed and even drycleaned clothes emit odors strange to him and he clears the area fast when he detects them. Also don't use shaving cream, aftershave lotion, cologne or deodorants on the day you hunt. And don't smoke in the hunting area.

Place your blind downwind from the trails in valleys and hills where the wind is fairly constant. In other areas, hunt in twos and place your backs together to provide a lookout to accommodate morning and evening changing winds. When you stalk, always walk slowly with the wind in your face.

HEARING

Hearing is probably the deer's keenest sense, the slightest unfamiliar noise, even the light scratching of brush against pants, can spook him.

Offset this advantage by avoiding contact with anything that produces a noise, such as tree limbs, fallen tree branches, etc. Wear wool clothes which

produce the least noise in movement and contact. Remember that he heard your vehicle and left the immediate area, so hunt at least one-half mile from where you parked it. In a blind or tree stand, avoid moving your gun, your binoculars or your feet, each of which could make contact with the tree or blind. In stalking, move only a few steps at a time, then stop dead still; try to avoid brushing against anything or stepping on twigs.

Have you ever watched a deer feeding through the woods? He moves slowly, carefully placing each foot, and raising his head for a look around and testing the wind at frequent intervals. Do as he does, and you won't be wrong.

OTHER CHARACTERISTICS

The whitetail deer is a creature of habit. Surveys have shown through tagged deer that many never move from a territory of some five miles. Within this limited area, they have the things they must have—food, water, cover and a safe place to bed down.

It's up to you to capitalize on these fairly rigid habits. He feeds where he can find the tender tips of apple, hemlock, oak, ash and birch trees, in old apple orchards, and especially after lumbering or burn-over operations; he has a favorite watering place; he beds down on the sunny side of slopes and hills where cover is abundant. Better still, he habitually uses the same trails to get to these places. If you're to bag your deer, you must locate each of these places and intercept him at a spot on the trails most advantageous to you.

Also, a deer is very curious. When he's disturbed, he usually circles. So watch your backtrail; I've bagged several good deer which circled and then stood still on my backtrail watching me go forward. Two of my best friends and successful hunters constantly exploit this curiosity by stalking about 200 yards apart, one behind the other. The one in the rear quite often bags the buck which the one in front unknowingly spooked; the deer circled and turned into the path of the second hunter.

Always keep in mind that the deer is ever conscious of comforts, even as you and I. If the weather is cold, he seeks comfort by bedding down near the top and on the sunny sides of slopes and hills. If the wind is strong and variable, the deer is usually in a very nervous state and seeks to hide in dense growth.

All of the consistently successful hunters I know have learned these things about their deer adversary and still strive to learn more. The deer of today is more knowing than those of even 10 years ago. Now they leave the front end of their territory at the first sound of a four-wheel-drive vehicle and move into the back areas—from one half to three miles from a road, where only about 10 percent of the present day hunters hunt. So, do your area pre-scouting in the back areas, and hunt there in the legal season.

By knowing your deer adversary, you have greatly enhanced your chances of winning the battle of wits with the wild deer. Without this knowledge, you'd probably never see a deer, much less get a shot at him. ⬍

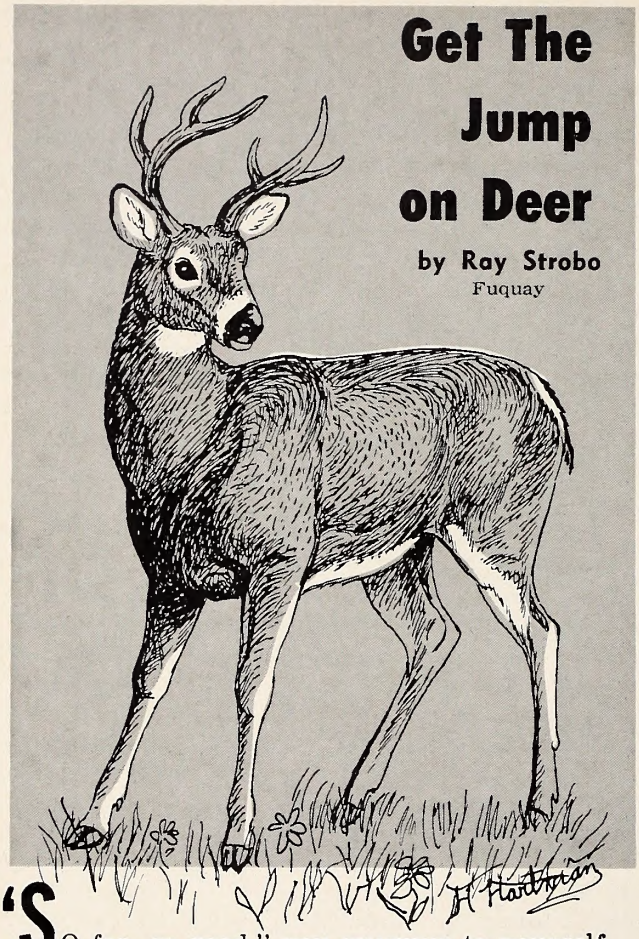
WILDLIFE PHOTO CONTEST

RULES

1. **Photographs taken in North Carolina, by North Carolina residents, which show any native North Carolina wildlife species will be eligible.**
2. **Eligible photographs must:**
   - **(a) Be taken in North Carolina between August 31, 1972 and November 1, 1973.**
   - **(b) Be taken and submitted by residents of North Carolina.**
   - **(c) Show native North Carolina wildlife species (any animal, fish, bird, insect, etc.) General outdoor or landscape photographs should not be submitted.**
3. **Black and white prints and color transparencies (any size) should be submitted. Do not send negatives nor color prints. However, negatives of the 10 winning photographs must be submitted on request.**
4. **DO NOT SUBMIT: (a) Prints or enlargements more than 8 x 10 inches in size; (b) Prints with retouching or art work, or prints made from negatives with retouching or art work; (c) composite pictures, multiple printing or montages; (d) framed pictures; (e) color prints of any kind.**
5. **Entrants should submit no more than three photographs each in each category (black and white, color). Each photograph should be submitted as a separate entry and each entry should include with the submitted photographs, the following information printed on the back of each photograph or on envelope: (a) Name of entrant; (b) Complete address and zip code of entrant; (c) Date photograph was taken; (d) Place photograph was taken; (e) Type of camera used; (f) Type of film used; (g) Shutter speed and f stop settings used (except for photographs taken with box cameras); (h) Title or name of subject.**
6. **Contest is open only to amateur photographers. No photographer who earns more than $100 per year from photographic pursuits will be considered an amateur.**
7. **All entries must be post marked no later than midnight November 15, 1973. Mail entries to: WILDLIFE PHOTOGRAPHY CONTEST, Wildlife Magazine, Albemarle Bldg., 325 N. Solisbury, Raleigh, N. C. 27611.**
8. **In each category the first prize is $25.00; second prize is $10.00; third prize is $5.00; seven honorable mention prizes of a subscription to Wildlife magazine. The winning photographs and honorable mentions will be printed in Wildlife magazine.**

Get The Jump on Deer

by Ray Strobo
Fuquay



"SO far, so good," you murmur to yourself.

Deer season will officially open in an hour or so and you are where you want to be. As your breathing returns to normal from the exertion of climbing into the tree stand, you sit down and lean against one of the trees supporting the stand.

This is a good time. Your body is overheated from the hike and the climb so that you do not feel the cold yet. It is a full hour before daylight—the woods are quiet—none of the noises of birds, animals, wind, or limbs crackling, which you will later interpret to be deer sounds. As you sit, your mind begins to wander back over the events leading up to this morning.

The hunt actually began weeks before when you decided on a site for the season's opening day. Being a relative newcomer to the area, you were somewhat concerned about the choices available. Eventually, it was decided that a nearby Wildlife Commission Game Land should be investigated.

Accordingly, maps of the area were obtained and were studied, noting prominent terrain features such as lakes, creeks, roads and hills. Several areas were circled for more detailed investigation: the northern border of a lake, a creek bottom, the valley between two hills. Now for a first-hand look at the area.

It will take several Saturdays to scout the area, and, of course, that will take some explaining because the families of deer hunters do not understand what motivates the head of the household to spend his free days rubbing stinking compounds into his boots, cleaning guns (which are still clean from last year), wandering around the woods 60 miles from home on a beautiful Saturday, or poring over maps as if the were the directions to a lost gold mine. But they still tolerate you. You have tried many times to explain the motivations of a sportsman. Sometimes they seem to understand. Then you fall into a frozen duck pond and come home soaking wet with ice crystals in your hair. The shaking of their heads tells you they haven't quite got it yet. However, each year they become more tolerant and there is hope for them yet.

Your first pre-season scouting trip is devoted to a general ride-around, checking the conditions of the roads, finding the area boundaries and translating the map into recognizable features. Subsequent trips provide you with specific information on feeding areas, trails, and watering spots. You decide that the best way to hunt the area is from a stand located near a trail, bedding area, or feeding ground. Possible sites are considered and discarded for various reasons. Other possibilities come to mind but do not quite fill the bill.

And then late one afternoon, you find it: a small knoll halfway between a ridge and open valley, overlooking a game trail and a thicket used for bedding. There are two trees sufficiently close together to hold a platform, and they are not so far from the road that you couldn't drag a buck out. Perfect.

On your next trip, you carry the building materials and tools and the day's work ends in a tree stand 20 feet above the ground with fields of view ranging from 50 yards in the direction of the thicket to 125 yards down the small valley. Sitting in the stand, it is easy to imagine a buck cresting the ridge, walking straight into your sights. In your mind, you see a sleepy buck emerging from the thicket at daylight, or a cautious old monarch feeding slowly up the valley to his bedding area at dusk.

The most important pre-season task completed, you feel almost jubilant. You now busy yourself with the assembling and readying of the paraphernalia of a deer hunter; warm, comfortable boots, a sharp skinning knife, tie strings, a rope to raise and lower items from the stand, gloves, a warm cap, a plastic sheet to keep the skinned carcass clean, ammunition—a seemingly endless list of things. Then you zero in the rifle. With each shot fired at the paper target, you are back in the stand, squeezing down on the biggest buck of your life.

Then, curiously, you are ready. No more scouting expeditions, no more searching through hunting clothes and equipment, no more checklists and worrying if you have thought of everything—you are ready. Opening day is six days away. The hours spent on preparation for THE DAY seem insignificant as you contemplate the upcoming contest—the contest between skill, experience and technology—yours—and the ages of inherited instincts;

senses sharpened beyond those of any man, a oneness with the environment. You have done all you know to tilt the odds in your favor but you are realistic; yours is a poor bet going against one of the smartest animals in the country, a mature whitetail.

The night before the hunt is spent packing the car. Clothes are laid out, the gun is by the door, and the thermos by the stove. The alarm clock is set for 3 A.M. You are in bed early, but do not sleep. Night long examinations of the clock indicate an almost total standstill of time. Finally, you can stand it no longer and you shut off the alarm before it can ring. Downstairs you dress and eat a hurried breakfast. The thermos is filled with coffee and a lunch is packed. You're off.

The drive to the Game Land is filled with doubts. "What did I forget?" "Did I choose the best place?" "Will he be there this morning?" A half-moon and a Heaven filled with stars illuminate the landscape. The forecast is for clear and cold weather. It looks great.

You park the car in an old logging trail off of the paved road—panic!—where is the flashlight? The trail to the stand cannot be followed in the darkness without a light. Where is—relief floods over you. The flashlight is in the jacket pocket where you put it the night before.

You shoulder your rifle and the small pack and search out the trail markings. You have made this trip many times during daylight hours, but never in the dark. Still it seems as familiar to you as your own backyard and soon you are on the ridge above the stand. Then, you are at the foot of the two trees. You secure your rifle and pack with the long rope.

As you place your foot on the first spike-step, you become aware of just how quiet the woods are. No sound except your breathing. You feel like an intruder into nature's world, a place where you will always be the tolerated visitor, never an accepted citizen.

The cold chill passing through your body chases away your reveries and brings you back to the present. You shiver slightly—that last cup of coffee has long since exhausted its warmth. The sky is a little grayer, not so black, and the thoughts of sunrise warm you as you stand quietly, rifle in hand. A glance at your watch indicates that sunrise should be only 15 minutes away.

A bird awakes, utters a sleepy chirp, and then falls into silence. But the daily ritual has begun. Another bird chimes in, then another. One flits across the ground below. The cold goes unnoticed now. The head swivels slowly, eyes searching out the dark shadows. Light begins to filter across the woods, and with it comes the knowledge that the time of contest is approaching. Even now the buck may be making his way from the thicket. Or he may be staring at you.

You quiet your thoughts, take a deep breath of the frigid air and will your body to be still. Opening day has arrived and the proof of it is in your "buck fever." Finally, your pulse stops racing, your breathing returns to approximately normal, and your body relaxes.

The sounds of the forest increase and for the first time you are aware of sounds coming from the thicket. A bird? A squirrel? You carefully face that direction but try to remind yourself of the many things that can sound like a deer. The noise comes again, close this time. You move nearer the edge of the stand quietly, all senses focused on the thicket.

Your imagination has played this scene so many times that the actual happening seems almost to be fantasy rather than reality. The sun has edged up enough so that the ground is visible at the border of the thicket and it is to this area that your eyes are fixed.

The movement stops, silence. Has he winded you? Heard you? Seconds pass with the slowness of hours. Movement again, the shaking of a sapling. A form passes behind a large oak. Again, silence. The suspense mounts and your heart pounds. Your muscles ache from the weight of the rifle, and your mouth is so dry you can't swallow.

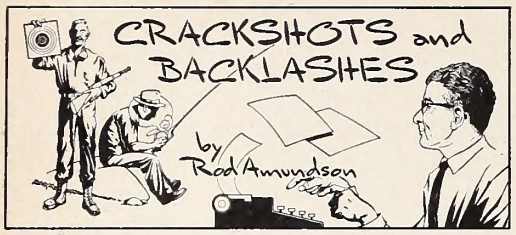
You think you see the tip of an antler extending beyond the oak. No, maybe it's a branch. There is definitely a deer there but is it male or female? Small or large? You have decided not to shoot a spike or a doe this year. The deer moves forward one step, two. The head is visible, you see at least four points. The shoulder is visible now, you release the safety and line up the sights. Gently now, don't jerk. The shot echoes through the woods.

Opening day has ended and on the drive home you begin to unwind and remember. It was all you thought it would be and more. The satisfaction you feel from your investment in this day cannot be put into words—you try to collect your thoughts and verbally express them but wind up saying to yourself, "Someone would have to be there to understand." Your emotions of this day have run the gamut from fear to pride to humility to reverence to exhilaration.

Those who do not communicate with nature on a one-to-one, personal basis are to be pitied you decide. Their life is incomplete. To remove oneself from the mind-boggling world of modern man, to walk through woods and fields where envy and hatred and greed and man's perverted sense of his destiny dare not go; to learn and relearn from the workings of nature, to make peace with yourself and your Creator—these and more are the motivations that you would share with others.

You shake your head, embarrassed at the philosophical turn your thoughts have taken. For perhaps the twentieth time, you glance into the mirror which has been set to give you a view of the back of the station wagon. He is still there, all eight points of him. Many opening days have come and gone, but this one has been the best.

But you can always say that. And win, lose, or draw, you will probably say the same thing again next year. ⬍⬍



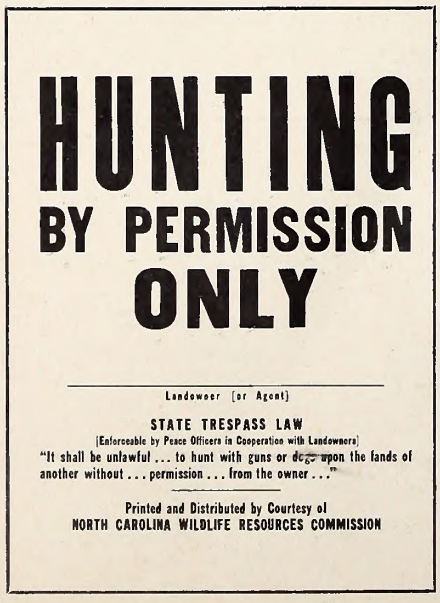
Having trouble with trespassers and poachers? The Wildlife Resources Commission may have an answer to your problem. The Commission has printed posters such as illustrated here that present a challenge to a hunter's sporting instincts.

When he sees one of these posters a thought something like this runs through his mind: "If this farmer is man enough to allow me to hunt on his property if I ask for permission, I ought to be man enough to ask him for it."

A seasoned trespasser-poacher is likely to tear down a "Posted" or "No Hunting" sign and go about the business of invading your property, killing game, tearing down fences, leaving gates open, and otherwise making a general nuisance of himself.

The "Hunting by Permission Only" posters are free of charge. For an application form, just send a postcard to Wildlife Resources Commission, Albemarle Building, Raleigh 27611.

A man who asks permsision to hunt on your land is likely to consider himself a guest—and conduct himself as such.



More On Trapping

Dear Sir:

I am a regular reader of Wildlife and enjoy it very much. I consider myself a true sportsman. I have read many articles with great interest, but this is in reference to June issue of Crackshots and Backlashes by George P. Carr, Wilson, about trapping. Mr. Carr expressed the opinion of many sportsmen, especially those that use dogs in Eastern North Carolina. I don't understand the many responses printed against this article in the August issue. I am not against trapping in general, but a lot of points Mr. Carr brought out were true. I know of good deer, rabbit, and raccoon dogs that were ruined by being caught in these steel spring traps. All traps are *not* attended regularly, leaving many animals to suffer a long while before they die. The "Conibear" trap of reasonable size would not cause as much damage for the hunters and would be more humane than the steel spring traps. It is not an issue of hunters against trappers or vice-versa. There are those who abuse both sports, causing each to have to defend their own sport. Trapping and hunting both are an American Heritage. I think that the responders criticized Mr. Carr's opinion too severely since there is much to be said for both sides.

Sincerely,
William B. Hollowell
Tyner

Observant

Dear Sir:

I would like to comment on the article in the August issue of "Wildlife", "To Build a Campfire." I think this was a very good article and had some good points on building a safe campfire and extinguishing it. I especially liked the idea of resoding the area where the campfire was. But there is one point I would like to bring out. I noticed in the photo, by Travel and Promotion Division, a camp was set up near a very fine pine tree. This pine tree had many ax chops on it. These chops were apparently made by the camper or by an earlier camper using the same camp site, chopping his fire wood or by his carelessness. You find these chopped trees at a large percentage of camp sites. These chops injure the trees seriously. Sometimes they kill the trees or weaken them to the point that harmful insects attack them. I don't think a good camper should ever chop on a tree, or knock the bark off or drive nails in a tree, or build a fire too close to a tree.

Camping is a very fine sport and I am very much in favor of it. I am very much in favor of the multiple use forest plan.

Sincerely,
Lane Poole
Troy

Snake Bite?

Dear Sir:

This is in response to the article in the August issue on "Night of the Frog."

In this article Mr. Chauncey states, "It is only hearsay as to whether or not a snake will bite while in the water."

I can assure him they will. While swimming with other people in our local WILDLIFE area last summer, my husband was bitten on the finger by some type of water snake.

This can be verified by one of our local physicians.

I enjoy reading your articles each month.

Thank you,
Mrs. Jeanette Ormond
New Bern

"Carnivorous Plants"

Dear Sir:

The article 'Carnivorous Plants' by Alan Kocan in the August issue is a most excellent one. It is not only good reading, but the characterictics of the various plants are very accurately described.

It is unfortunate that the names of two of the Pitcher Plants were interchanged. The one called Yellow Pitcher Plant is clearly Sarracenia minor Walter, or the Hooded Pitcher Plant. The other one captioned Hooded Pitcher Plant is Sarracenia flava L., commonly called Yellow

Trumpet. For confirmation consult 'Manual of the Vascular Flora of the Carolinas', Radford, Ahles, Bell.

I would like to take this opportunity to commend you on the publishing of this and other articles on our native wildflowers. You are calling them to the attention of those people who are most apt to see them and who will, therefore, become more appreciative of the beauties of our native flora and who will be more aware of the need to preserve this one of our greatest natural resources.

Yours very truly,
Thomas S. Shinn,
President N. C.
Wildflower Preservation Society

• The transposition of the pitcher plant names occurred in laying out this feature and was not the error of author-photographer Kocan. Our thanks to the many readers who caught this switch and the range comments. Ed.

Cougars Are Protected

Dear Sir:

I read with a great deal of interest the article "Lion" by Tom Shelton which appeared in the September 1973 issue of "Wildlife in North Carolina". Game biologists in several of the Atlantic Seaboard states have watched with a great deal of interest the apparent increase in one of the rarest mammals in North America, namely, the Eastern Cougar (*Felis concolor cougar*). Both the Eastern Cougar and the Florida Cougar (*Felis concolor coryi*) are endangered and protected by both state and federal laws. The 1971 General Assembly of North Carolina gave full protection to the Eastern Cougar (GS 113-102) and it is to be hoped that a viable breeding population will become established in our state.

Since we have yet to examine a valid cast of a cougar's track in North Carolina, would you please notify your readers that we would like to have more documentary evidence (photographs or track casts) of the occurrence of the species in this state and also please call attention to the fact that cougars are protected at *all* times in North Carolina. The cougar is a magnificent game animal that would be a real asset to our fauna. It would be particularly beneficial to the health of some of our deer herds.

Sincerely yours,
Frederick S. Barkalow, Jr.
Professor of Zoology &
Forestry, N. C. State
University

The Death Of A Trout Stream

A splash of blue-green, peppered with yellow, bright colors of the spectrum leap from ebony sheltered springs. He may shame a peacock. From his haunt comes the purest drink, most refreshing breath, and the cinnamon ferns so endeared.

I speak of *Salvelinus fontinalis* or the "brookie" to most of us. He rode the great glaciers. Not a trout mind you, but the only one of his class found in the area before our presence. Alas, for it has been three summers since one devoured my hackled offering in the once crystal waters of my beloved Steeles. They seem replaced by rosy-sided dace, hog suckers, tons of silt and an occasional small rainbow.

I'm not very old and certainly the pools of Steeles Creek are ancient, but visits there have been frequent enough to lay claim to a sizable portion of my life and memoirs. One man has given his life protecting this area and this stream may eventually get mine. Until then, it will continue to cool my feet and thoughts as I remember what it once was—before they built four black paths up the grade belching redness down its sides. It's a deathly redness that chokes the trickles, the stones, the larvae, and the gills. We can now reminisce this heaven—not a producer of wall-sized trophies but once a home of brookies. Dead forever?

Bo Cash
Shelby

One of these days a North Carolina hunter is going to draw a bead on a mountain lion right here in the Tar Heel state. DON'T SHOOT!! Not only are these animals protected by state law (G.S. 113-102(d) was amended in 1971 by adding "It shall be unlawful to take North American panthers (cougars) at any time."), but perhaps even more importantly, killing even one of these animals would seriously diminish this rare and endanged species.

There is much conjecture about the status of the cougar in our state, and some think that it will never again be seen here. Yet, many qualified observers believe that it may likely be making an inch by inch comeback in the Southeast. An account by Tom Shelton in our September magazine leaves little question about this situation. What we failed to point out, however, is that the cougar is fully protected by state law. And that perhaps hunting clubs might wish to take even extra precautions about accidental killings of cougars. It may seem strange to some folks that measures are suggested for the protection of a critter whose status is so doubtful in our state.

The temptation to shoot such a magnificent animal may be strong . . . even greater than that of killing a hawk or an eagle . . ., but the thrill and pride of NOT shooting will be even greater. Please don't shoot!

Small radents, such as this white-faated mause, serve as faad far the weasel, althaugh they will take birds, snakes, and even insects.

The mink is a clase relative af the weasel, samewhat larger, and perhaps mare abundant and mare frequently seen than the weasel.

about the WEASEL

Althaugh the lang-tailed weasel daes molt its brawn summer caat and acquire the white fur and black-tipped tail in its narthern range, it is daubtful that this change takes place in our regian.

WEASEL TRACKS

MINK TRACKS

Wade Clifton Walker Jr.

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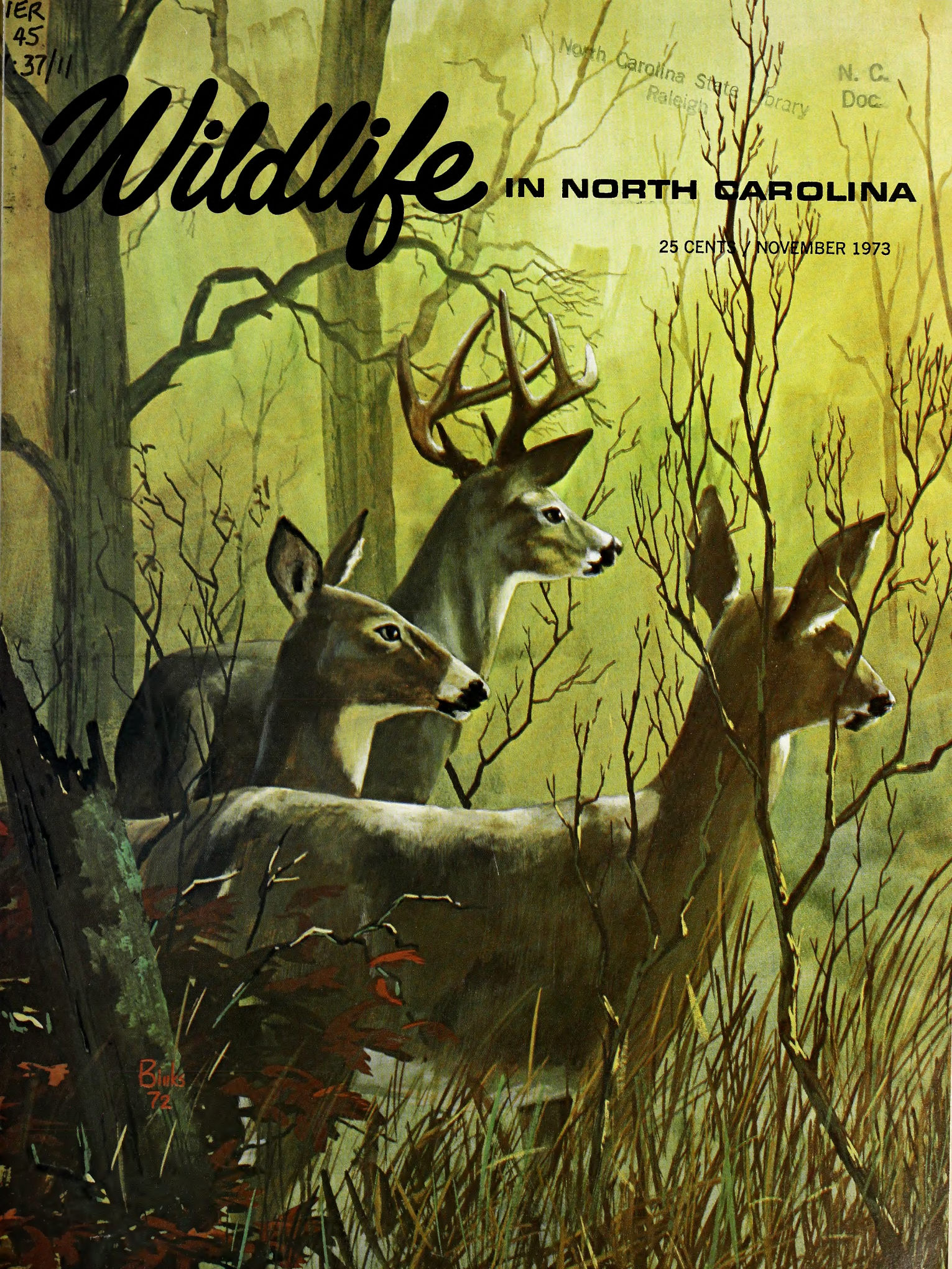

PHOTO BY JACK DERMID

Nobility

Perhaps it's a bit dangerous, assigning rank or "titles" to fish or game, but when they are bestowed, the Canada goose gets my vote for some sort of nobility.

Be smarter than a fox-

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

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WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

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Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage except APO and U.S. possessions. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 99,720

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 11 NOVEMBER, 1973

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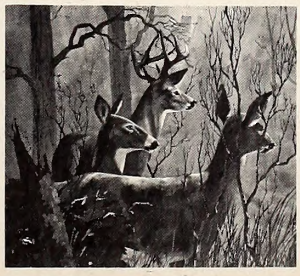
An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.

Bob Binks, one of North Carolina's fine wildlife artists, won first place in last year's Wildlife Art Exhibition with this painting of white-tailed deer. This Exhibition is planned again for this year and details are on the back cover. You'll very likely see next November's Wildlife magazine cover displayed there! Painting courtesy Dr. Carroll Mann, III, Raleigh.



The Cottontail

by Rod Amundson

AN experienced hunter brought his car to a stop along a country road. He watched a small boy carrying an old shotgun. A few yards ahead was a yellow dog of mixed ancestry. The dog sniffed around a patch of weeds from which a cottontail rabbit sprinted with the dog in close pursuit.

"Sic 'em! Sic 'em!" WHAM! The shotgun blazed away and the rabbit stopped in a kicking heap, just a few feet ahead of the dog.

"Hey buddy, come over here," called the man. The boy picked up the rabbit and walked over to the car.

"That was a pretty good shot, son, but don't you think you shot a little close to your dog?"

"No, sir."

"Well, how come you hollered 'sic 'em' at the dog? He was doing all right."

"You see, sir, sometimes I miss—and I wanted the dog to get a good start."

The cottontail rabbit is one of the most popular game mammals in North Carolina, or for that matter, the entire country. In our state it ranks second only to the gray squirrel in the number of hunters and hunter trips afield. Nationwide it probably provides more food on the table than all other game mammals combined.

North Carolina has at least three, and perhaps four, species of cottontails. Most prevalent is the eastern cottontail (*Sylvilagus floridanus*), which ranges throughout the state. In the Coastal Plain is the marsh rabbit, or blue-tail (*Sylvilagus palustris*) and the New England cottontail (*Sylvilagus transitionalis*) is found in the Roan Mountain vicinity.

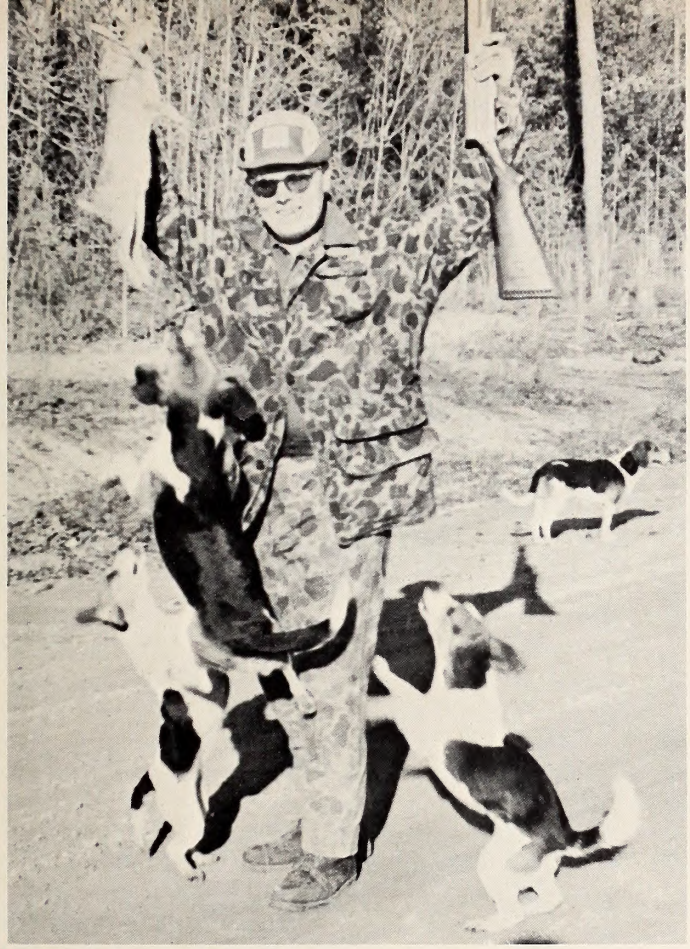
There is some reason to believe the swamp rabbit (*Sylvilagus aquaticus*), or cane cutter, exists in the region where North Carolina, South Carolina, and Georgia meet in the Highlands-High Hampton region. These are not to be confused with the marsh rabbit, since these are sometimes called "cane cutter" by local people.

The eastern cottontail has a length of about 18 inches. The upper parts are a dark rusty yellowish with black washing. The undersides are whitish and the underside of the tail is snow-white, hence the name "cottontail."

The Carolina marsh rabbit is about the same size as the eastern cottontail, but differs in coloration. The upper parts are a rich, dark reddish brown. The back of the hind legs is rusty reddish, and the nape is dark rufous. The tail is not white on the underside, but a dingy bluish gray, which accounts for the local name, "bluetail."

The New England cottontail is the smallest of the group, being only 15 to 16 inches in length. It is distinguished by rich, pinkish buffy upper parts, sometimes heavily washed with black streakings.

The swamp rabbit is the largest of the group, measuring from 21 to 22 inches. The upper parts are grayish brown washed with reddish buffy



The payoff for successful rabbit management. Hunting seldom harms any wildlife population, if it is done lawfully. This is certainly true in the case of the prolific cottontail.

brown. The rump is grayish brown. Underparts are white, and the legs and feet are cinnamon rufous in color.

Because of their well-known reproduction capabilities, cottontail rabbits can withstand a great deal of hunting pressure. They are the prized quarry of small boys and exciting targets for seasoned sportsmen.

Population trends among cottontails vary from year to year and from locality to locality, but over the years the species has been reasonably abundant despite hunting pressure and predatory birds and mammals.

Cottontails are an important item on the menu of both gray and red foxes and this has led to considerable disagreement between hunters who favor rabbit hunting as a sport and those who follow the foxhounds.

A mass of information obtained over the years indicates that there are no real grounds for dispute. Surveys have shown that for the most part rabbits are most abundant where foxes are also abundant. It would appear that because of the rabbits' proclivity for reproduction, hunters can have their foxes and rabbits, too.

In this part of the country, cottontails reproduce almost throughout the entire year. In a year's time, one female can produce several litters with an average of four per litter. Litters are born in nests made of grass and leaves, lined with downy hair from the mother's breast. At birth the young are naked, helpless, and blind. They develop rapidly, however, and are soon able to leave the nest to fend for themselves.

The food of cottontails is almost a complete index of the vegetation around them. They prefer tender green leaves, especially clover and grass, and all too often, vegetables from kitchen gardens. In the winter, they get along very well on twigs and bark of young trees, and other vegetation.

In addition to hunters and trappers, rabbits have other enemies. Among these are stray dogs, and cats, foxes, wildcats, mink, weasels, hawks, owls, and sometimes crows. Most common parasites are ticks, lice, fleas and the larvae of botflies, called locally "wolves."

Only one disease seriously afflicts rabbits in the wild. This is tularemia, often called rabbit fever. The disease takes its name from Tulare County, California, where it was first diagnosed and where it was found to be transmittable to humans who handle infected rabbits.

Back in 1947 there were 74 cases of tularemia reported in North Carolina. According to a recent report from Dr. Martin Hines, State Epidemiologist with the North Carolina Board of Health, there have only been 41 cases altogether in the last 10 years, with none reported in 1972 and none as of mid-July 1973. Hines also reported that humans can contract tularemia from the bites of ticks and deer flies.

Wildlife management practices that benefit other wildlife species are generally beneficial to cottontails. Their basic requirements are food and cover, and when these are abundant, rabbits are too. Food patches and field border plantings for doves and quail also benefit rabbits. Woodland clearings for the benefit of wild turkeys and deer also benefit rabbits.

Such artificial devices as rail fences and brush piles provide additional habitat for rabbits. Very little deliberate cottontail habitat improvement is actually done or needed in North Carolina. Given anything like suitable habitat, the cottontail will hold its own against the combined adversities of man and nature.

Rabbit hunting can run anywhere between the extremes of simplicity and complexity. The habit of "freezing" in the presence of danger in the belief his protective color makes him invisible makes the rabbit vulnerable to the slingshots of small boys. His speed and craft in running make him a prized quarry for seasoned hunters with trained beagles. Many a sophisticated sportsman got his first thrill of the hunt with a mail-order shotgun and a half-trained houn' dawg. A running rabbit in an open field may seem an easy mark, but in his element of briars and brush he can furnish a world of sport. ⬍⬍

PHOTO BY JOHN R. DARKER, JR.

The Compleat Fowler

R. Wharton Gaul, M.D.

PART II

IN the previous article way last fall, we were discussing the arrangement of decoys for puddle duck hunting. These include the green-headed mallard, black ducks, wigeon (or baldpate), the teals, pintails, spoonbills, gray ducks, and for completeness, the wood duck, although this last is not hunted with decoys. It was pointed out that a combination of mallard decoys with a few pintail (sprig), black and wigeon blocks will do the trick. But there is a little more to it than that, and some other tricks can be tried as well. For one thing, black ducks will almost never come in to any duck except another black. They may overfly and take a close look, but don't expect them to return. Put your black dekes off to one side, possibly a little closer to shore than the others. They keep to themselves.

For another thing, if you have access to some crow decoys, place them around your blind in likely places, if you are ashore. The sight of a crow breeds confidence in a circling flight of puddle ducks. In fact that is the name fowlers gave them years ago—*confidence decoys.*

Along similar lines we find a paradox. Pintails rarely decoy, but when they do, it is usually in a group. Personally, I would settle for a pass shot, but do as you please. Often they circle a few times and decide to investigate another county. But the sight of a few sprig blocks in your spread will often act as a confidence decoy to other puddlers. Incidentally, it is said that sprig will decoy to geese, and thus to goose decoys. So will several of the diver group. I have never seen sprig do this but it is worth a try.

It is also said that mallards will decoy to snow geese. But a snow goose decoy is a real rarity in these parts. The same applies to swan decoys, now virtually nonexistent. Wigeon and probably other puddlers accept them as confidence decoys. This is why the oldtime market hunters had a few swan decoys in their rigs. And as a final point, teal will decoy to almost any puddler. But if they change their minds, they will be in Mexico before you know they are there.

Divers are another matter. The art of bringing in a canvasback, redhead, ringneck, bluebill or broadbill, or goldeneye is something else again. Mostly you will be shooting over open water. Large rigs of large decoys are necessary for the best results. As mentioned earlier, the oldtimers thought nothing of putting out 200 canvasback decoys for a day's shooting on the open waters of the Chesapeake. Fortunately we do not have to go this far, but 25 or more diver blocks should be used for satisfactory results. And as with the puddle ducks, only a few types are necessary. A mixture of cans and bluebill (scaup) will do as well as any and better than most. Sex is probably even less important than with puddlers.

From my own observations, I would say that

The art of using waterfowl decoys successfully includes far more than meets the eye. Although even the best of set-ups sometimes fail, doing it the "right" way will bring more birds your way.

three things are a must: Outline or silhouette, light colored backs on the cans, and white patches on the sides of the scaup. Once I painted some mallard blocks with scaup colors. It was quite interesting to watch the scaup flare off when they could not recognize the shape of the decoys. Puddle ducks keep their tails straight out from the body while divers' backs seem to slope into the water with no visible tail. Apparently the colors attracted the scaup until they were close enough to spot the outline. Away they went, no doubt somewhat confused.

The shape of the spread is a bit more important here. The classical arrangement is the fishhook or pipestem spread. It embraces two cardinal ideas. The far end of the hook or pipe extends well away from the blind to attract passing flights, as mentioned under puddleduck decoys. Proceeding towards the blind, more blocks are grouped, leaving a hole in the middle of the hook for the birds to land in. This hole is in front of the blind.

Divers, unlke puddlers, land in the midst of the decoys. This has been said to result from the smaller wings of divers not being able to stop them as rapidly as is the case with puddlers. I am inclined to believe that the diving duck, like the brook trout, is just a little more stupid than his relatives. But maybe not. And like all waterfowl, divers land upwind.

Other arrangements work under other conditions. Offshore blinds need only be surrounded by decoys, with most of them upwind, so that flaring ducks will be within range. Leave open areas around the blind. It was pointed out in an earlier article (*Bonus Scaup,* WNC Nov. 1970) that it was the custom of market hunters of the 1880's on the Chesapeake Bay to leave at least four feet between blocks. This is still a good rule today. And if you are hunting from shore, remember that diving ducks will never under any circumstances cross land if there is any way to avoid it. Arrange your rig accordingly.

As another point, always keep each species of duck separate. When a bluebill decoys to a mixed spread, he will land among the bluebill decoys. Give him the chance to do so.

Possibly sea ducks should be included with divers. These include the three types of scoters (surf, common and white winged), old squaws, and the North Atlantic harlequin, an extremely rare visitor to these parts. Hunting sea ducks is an entirely different game. This writer's experience is limited to white-winged scoters that appeared on the Pamlico River one winter, plus the occasional old squaw that has found its way into the can-bluebill spreads on the Pamlico Sound itself. Check the outdoor magazines for details on these ducks.

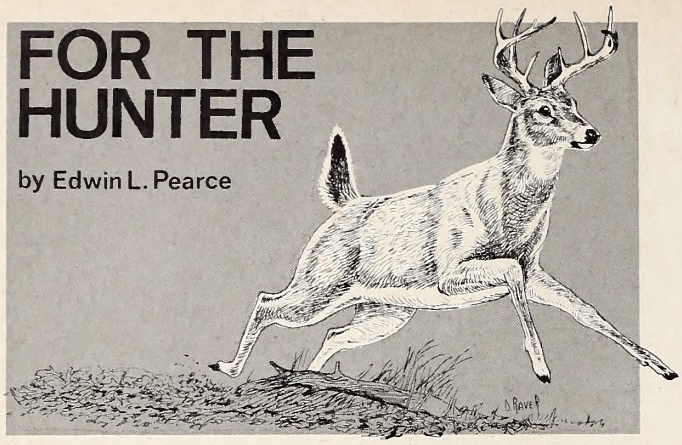
One of the most fascinating articles on sea duck hunting can be found in Joel Barbour's *Wild Fowl Decoys,* originally published by Windward House in 1934 and reprinted by Dover Publications in 1954. He tells of the men of the Maritime Provinces and their methods of hunting ducks on the North Atlantic seas in wintertime. It makes our wildfowling seem pretty tame.

Little needs to be said about geese here. (see "The Cornfielders," page 10) Only on their roosting grounds, far from shore, is there a chance of bringing them into decoys on water. There are a few such areas where the addition of goose blocks may bring in the honkers, but for the most part, Canada goose decoys are added to a spread as either confidence decoys, or as an attractor because of their large size. Most large salt water rigs include a few geese. Canvasbacks in particular seem to feel secure in the presence of geese.

Finally, long-time duck hunters have added a few refinements that may bring in the birds on those days when they behave like a coy schoolgirl. The many types of tolling are beyond the scope of this article. But other tricks deserve mention. As an example, geese that feel safe often go ashore to rest. Many fowlers add a few shore decoys in the form of resting geese. Several companies produce tipping decoys, resembling the hind ends of ducks that are feeding on the bottom. And on those still, bluebird days when hardly a ripple disturbs the water, a feeding decoy, controlled by a string in the blind, can ruffle the surface enough to persuade distant ducks that here there is feed and safety enough to warrant investigation.

FOR THE HUNTER

by Edwin L. Pearce



This month, Ed Peorce sets us to thinking obout success ond failure when it comes to trying to bring home o nice buck. Moybe some tips will help you.

WHAT is America's No. 1 challenge in wild game?

For sure, a dozen creatures could be nominated—turkeys, elk, grizzlies, the antelope, mountain dwelling rams and many more. But when all the ballots are in and counted, the deer would be voted the distinction by a landslide. Whether it's the blacktail, the mule deer or the whitetail seems to make little difference. Today the deer is the most desired and most hunted wild game in this country.

There's no question but that the deer also presents the most decided challenge to the hunter.

Deer hunting is probably the most competitive sport of all, for here you're matching your acquired skills with those of a wise and powerful adversary. By the rules of the game, you must always compete with him in his own environment and on the days specified by law.

In your quest for deer, you're legally required to use specified types of gun and ammunition, to buy licenses and obtain permits, to shoot only bucks in certain areas, and to hunt during inclement and cold weather in difficult terrain which is completely different from your accustomed surroundings. You're pitted against a worthy adversary which knows every rule in the book, and sometimes makes his own. So you hunt under a terrific handicap; you literally start with two strikes on you.

Whether you're already a hunter or only a would-be hunter, you must always keep in mind that your hunting skills must be learned because you have no inherited or built-in hunting instincts.

No "Pushover"

If you think deer hunting is a pushover, if you think all you have to do is to take a gun and "go hunting" to be successful, listen to some of the facts gathered by Professor Sidney W. Wilcox of the College of Engineering Sciences at Arizona State University in Tempe. He is conducting a five-year study titled "Deer Production in the United States." I quote from his published findings, "In 1971, 8,164,218 hunters harvested 1,866,918 deer." This is less than a 23 percent success ratio. I further quote from an article captioned "Georgia's White-Tailed Deer" by Aaron Pass published in the October 1972 issue of *Outdoors in Georgia,* "Last year's (1971) harvest of deer accounted for 33,348 deer taken by 155,275 hunters." This is less than a 21.5 percent of success ratio.

It can be seen that only about one in five hunters is successful in any given year, regardless of the number of times he goes hunting. In the article referred to above by Aaron Pass, he further states "The average Georgia hunter spends seven and a half days hunting each season and collects a deer for every 35 days he hunts; about one deer every five seasons."

These statistics are generally corroborated by those of all states.

In spite of these known facts, such is the challenge of deer hunting to the American sportsman that over 50 percent of the 19 million licensed hunters (1972) in the United States go after deer each year.

What these figures don't show is that, of the approximate 20 in 100 deer hunters who are successful each season, at least 13 of the 20 are repeaters—they get their deer year after year without fail. They're what I call the successful hunters.

I've been fortunate to have hunted deer in some 20 states, in Europe and the Far East, and it's also been my good fortune to have hunted with many hunters who are included in this 13 percent of deer hunters whom I call successful.

There has to be a reason for their continued success. You can rule out luck in their cases because luck distributes its largess fairly evenly to all hunters.

In my search for these reasons, each year I'm becoming more and more convinced that their success is based on many little things.

To a man, they're dedicated to their sport with an almost fanatical zeal and fervor; they leave no stone unturned in their search for additional information which would give them an edge over the deer. After hunting with them, talking to them and watching their actions during many hunts, over more years than I care to admit, I've spotted many of the things which contribute to their success, and intend to pass them along to you. No one has yet corralled all there is to know about deer

Harvest of game is an important part of the management of that species. Regulations limit the harvest so that maximum use is made of each animal. Without harvest much of our deer range would become overpopulated.

hunting, but the 13 percent of hunters who are really successful do agree on most of the basic principles.

"What Are the Rules?"

If you haven't been as successful as you desire, and want to join their ranks, compare your own thinking and hunting methods with theirs, learn their ground rules, and don't be reluctant to change or adopt new approaches. It'll not only take time and some soul searching, but also much effort and some finances if you're to match their success. But once you've learned their techniques which have been developed over many years of actual deer hunting, I'm sure you'll consider it well worth all you've put into it. It's very satisfying to really know what you're doing.

Because deer hunters like to keep up-to-date and are interested in the subject most every month of the year, a "corner" dealing only with deer hunting is to be included as often as space permits.

Some of the angles we'll be discussing in this "corner" in future issues will be "How To Conduct Yourself Outdoors," "How To Select Your Hunting Equipment," "What To Carry When Hunting," "How To Become a Good Marksman," and much, much more.

Watch for the articles! If they provide you with new ideas, added enjoyment and safety on your hunts and a sound basis upon which you can build your success, they'll have accomplished their purpose.

GOOD DEER HUNTING!

Spice Wood Tea

by Noma Lee Taylor
Hendersonville

THIS time of year is for spice wood tea.

Large flakes of snow are falling softly and swiftly. Fluffy snow flowers appear on the twigs.

"Child, this snow puts a chill in my bones," says Miss Annie. "Better stomp out a trail to the spice bush. I thought we had plenty. Get a move on now!"

Spice wood is a shrub growing from Maine, southward. It is a member of the laurel family and kin to sassafras.

Miss Annie says, "We drink it mostly because we like it. This time of year the cows go dry or fail considerably in their milk and this tea comes in handy."

"It takes only a small amount to make a potful. One just breaks up twigs and branches and cover with water. Let it come to a boil, then sit for a spell. Strain and sugar to taste.

Spice wood grows in swampy woods and along branches. The bushes are easily recognized by their dense clusters of yellow flowers in the Spring. Later, they bear bright oval berries.

We use the berries, dried, for pickling. They can be powdered and used as allspice.

The leaves are good as tea and the bark is pleasant to chew.

All ages here like this tea, especially the elderly. They have a dread for Winter with its howling winds and icy air. Annie says, "It just warms abody all over. I have always got my wants from the earth and I am content to drink the tea of the land."

The six inches of snow have made a silverly world with sharp blue spaces.

The sound of the crackling fire is heard and sitting by the window is Miss Annie, sipping her aromic spice wood tea.

The Cornfielders

by Wharton Gaul, M.D.
Charlotte

MY Lord, but it was cold! Dark, too. Only a slight fading out of the darkness across the field told us which way was east. It was pretty stupid being in a cornfield that early, but to a goose hunter, the first hunt of the year is a big thing, and he will take no chances on missing the morning flight of the mighty honker. If more excuse is necessary, there's always a chance of a shot at a mallard that has fed all night in his field. So there we were, half frozen, our breath standing out from us like jets of steam, floundering around in the dark with the decoys.

But this was the name of the game. Unless you know for a fact that the geese are feeding in a certain field and have not been hunted there, and unless you have permission to go into that field, you had better have a lot of decoys and know what to do with them. Where we hunt, the goose has a choice of thousands of rich fields. We figured we had best learn to decoy them in. And thanks to a lot of outstanding hunters and writers like Coykendall, Janes, Connett, and Grinnell, the facts are all there for the asking. Here's what we learned.

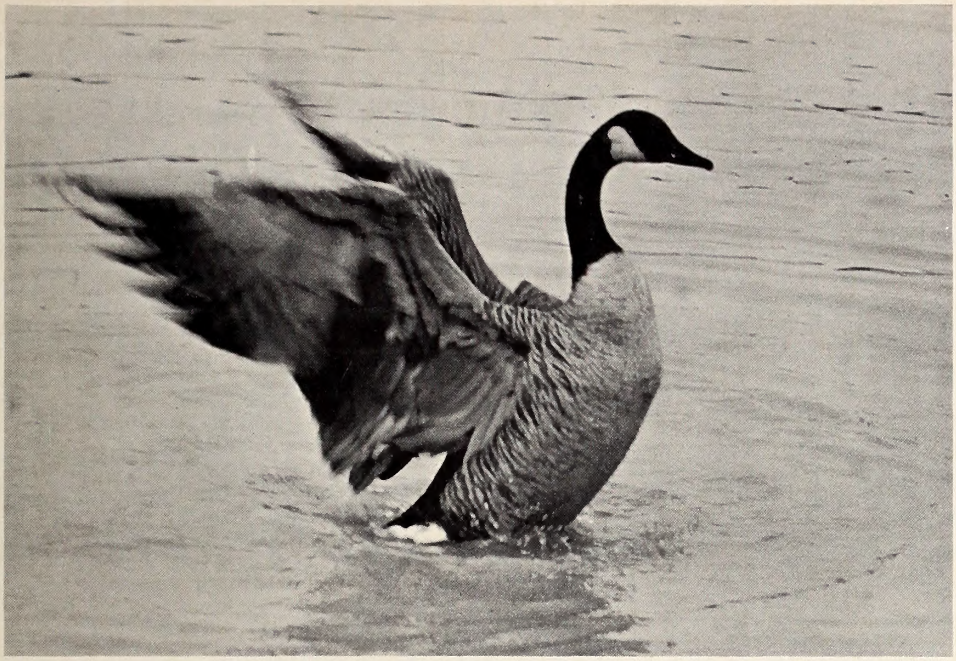
By and large, the Canada goose has two feeding patterns. When the moon is dark, or the skies overcast, he will fly out twice daily to feed, usually about sunrise and an hour or two before sunset. When the moon is bright, he feeds at night and rests by day. Storms affect these birds several ways. An approaching storm or severe freeze will usually lead to longer feeding than is normal. But when the storm breaks, he will sit tight if the winds approach hurricane force, or may feed throughout the day in a moderate blow with some rain or snow. A goose requires a wide safety margin when he rests in the wild state (as opposed to a refuge to which he is accustomed). It has been written that he will roost only when there is a mile of clear water around him. Possibly so, though that is a lot of water these days.

When it is time to feed, the geese set up a clamor that can be heard miles away. Finally the old lead gander takes his flight aloft, often consisting of a family or several family groups together. They usually know where they are going and after gaining the necessary altitude, they head for it as directly as the wind will allow. Generally they will not buck a stiff wind, however. Arriving at their site, they begin a patient circling that can seem to go on for years. Sometimes their circles will gradually drift away and perhaps into an adjacent cornfield. The least little thing can flair them away—unexpected motion in the brush, something white, a reflection from a shiny object, any of these will send your geese in search of other bounty.

But let's suppose that all is well, and at last the flight decides to land. The leader swings them into the wind and they gracefully glide to earth. In certain locations where a long glide would take them in low over cover that might conceal hunters or other enemies, they have a trick that is beautiful to watch. They will hold high over their landing spot a moment and then suddenly spill the air from their wings, plummeting earthward like a rock. As they near the ground, they spread their wings and glide in as pretty as you please. Our English brethren call this "whiffling down." Only an Englishman could call it that.

So now our geese are earthbound. Most such flights will contain about 12 to 20 geese. At times several flights will follow into the same field. Regardless, their behavior will fit a pattern. Immediately as they land, they will remain in a bunch facing upwind. All heads are erect and many beady eyes survey the landscape for signs of danger. After one, two or more minutes, depending on how hard they have been hunted, heads begin to drop to pick up the grains of corn or blades of rye.

Finally all but one head is down. Each flight will have a watch gander, usually an older goose, off to one side to watch for danger. Large flights may have more than one. After a bit, another goose waddles up to the watch gander, perhaps nipping him in the tail to tell him it's his turn to feed. And as the flock feeds, it will spread out. When all are satisfied, or the watch gander senses danger, a shrill honk, like a drill sergeant's command, brings



The challenge of finding and bagging a Canada goose in much of the South is even greater this season than ever before. Extra skill and care may make the difference for you.

PHOTO BY STEVE PRICE

attention. The leader springs up and the flight follows home to the roost. Only rarely will the flight feed elsewhere when it has once been spooked from a field. Rather, they will go out all the earlier next flight.

So what can we learn from this? Quite a lot. For one thing, if you watched the flight carefully, you noted that they did not land near the edge of the field, nor will they feed near the edges, even by moonlight. Safety lies in the middle. Furthermore, you will have noted that contented geese have their heads down and are spread out with at least five feet between birds. And there is always a watch goose. These are your basic lessons in decoying a goose. Now for a few refinements.

First, to be effective, a decoy must be visible. Lots of big, well-painted dekes are a must. Birds have no sense of size, and an oversized decoy merely seems closer to a goose. Next, the decoy must be in a reasonable area. Very few geese can be decoyed to a parking lot, although a cousin of mine once picked up a goose that mistook the roof of our coliseum for a lake by moonlight.

Choose a field with some feed in it, although you may not expose or otherwise move that food. Federal agents take a dim and gloomy view of such actions. Build your blind well enough so that you can completely hide in it. Nothing spooks a goose like the face (or bald head) of a hunter. Keep still. A man could sit next to a decoy and if he held still and covered his head, the geese would still come in. Few can hold that still.

The subject of goose-calling is a moot one. Few handle a call well enough to avoid spooking the geese. To be on the safe side, only an occasional call to a far distant flight should be used by the average caller. Ideally, there would be two experts on opposite sides of the field using overlapping calls. This is rarely available, however. Fortunately, the art of calling a goose is not the crucial issue. In some areas, such as the Louisiana bayous, calling blue and snow geese is an ancient art. Without it, far fewer geese would come to bag. But here in Carolina, one has a fair chance without calling.

These are the basics of goose hunting in the cornfields. If you try it, you will be matching yourself against the grandest gamebird of them all. Some would argue that the turkey deserves that title, but what turkey ever knew the glory of migration, the mystery of the Arctic, or could set aflame the heart of man and boy alike with his calling? If any bird could be called noble, this is the one. He and his brothers from coast to coast comprise one of nature's remarkable families. There are about 11 types of Canada goose, ranging from the giant Canada of the mid-west (*Branta canadensis maxima*), a rare and only recently rediscovered species, to our own Canada (*Branta canadensis canadensis*), to the tiny western cackling goose, no larger than a mallard. Biologists are not fully agreed on the number of species. They do agree that he is a magnificent bird.

Canada geese are a vanishing species in our state. Huge cornfields to the north, planted to provide feed for the chickens whose fried carcasses line our highways from coast to coast, hold them beyond our borders. But just you wait! These mild winters will not last. There will come hard freeze-ups that perhaps will drive the geese to our shores again. I intend to be there when it happens. And then perhaps once again roast wild goose will grace my table. Until then, well, he has beaten me the past three years. I salute him and wish him luck.

But, you know, it's a funny thing, even if you are able to fool a Canada, for some reason you can't really possess him. Rather it's the other way around. Because, when the following March comes with its full moon, and the Canadas head for the Arctic wilderness again, somehow, in some way, you will go with them. And you'll know it, when it happens.

Deer Hunters! Spread Out!

by Bill Zeedyk & Bob Carey
U. S. Forest Service

DID you find the Uwharrie National Forest overcrowded during last year's deer hunt? Chances are you did. And . . . if you did, chances are you hunted the old Uwharrie Wildlife Management area while ignoring the rest of the Forest.

On opening day 1972, an estimated 1,900 hunters crowded onto approximately 9,000 acres. Camping sites were cramped, roads clogged, and tempers short. Many hunters complained bitterly, suggesting that daily quotas or other limitations on hunter numbers be imposed.

Yet, within 10 miles, National Forest lands on Morris Mountain, Dusty Levels, Wood Run, Dutchman's Creek, and Roberdo were only lightly hunted. The deer were there, but the crowds were not. Scarcely anyone hunted the scattered tracts south of Troy. Why crowd onto only 9,000 acres when there are 46,000 acres of land available for your hunting enjoyment?

From sign, tracks and observation, the deer herd has reached high densities throughout the Uwharrie, excepting perhaps the Burkhead Mountain section of Randolph County. Generally, deer outside the old "refuge" are larger due to better food supplies and less gunning pressure.

Why then, won't the hunters spread out and enjoy these areas?

Several factors probably contribute: For one, most folks would rather return to a spot they know well than explore a new area. Another is the land ownership pattern. The former management area is almost solidly National Forest, meaning that folks can hunt comfortably without fear of accidentally trespassing upon posted land. Also, the road and trail systems are highly developed, making for easy access by car or on foot. Further, the open timber makes for good visibility. The deer are easy to see and the heavy pressure keeps them moving.

Is overcrowding inevitable? Are restrictions needed?

No. We believe there is a better answer to proper use of the Uwharrie deer herd. Quotas are not necessary. The answer lies in better distribution of hunting pressure.

To encourage deer hunters to spread out, the Forest Service and the North Carolina Wildlife Resources Commission have cooperated in a four-pronged program including these measures: land acquisition, boundary line survey and posting, campsite development, habitat development and game lands map preparation.

Within the past three years, the Forest Service has acquired several tracts totaling more than 1,800 acres that formerly were posted against public hunting. Three of these tracts are in key locations and have served to consolidate National Forest ownership in the Morris Mountain area. Now the Morris Mountain block is larger than the old Uwharrie area and access to it is greatly improved.

Boundary line surveying and posting have been accelerated with more than 30 percent of the lines being newly painted and posted. Both the standard Forest Service boundary line posters and the diamond-shaped Game Lands posters have been erected along those lines indicated on the map. The larger tracts have had priority so that these lands will be easily recognized by hunters unfamiliar with the area.

Wider distribution of campgrounds will also help disperse the crowds. Two new hunter campsites have been developed in preparation for the current deer season. Each can accommodate approximately 30 hunting parties. One is located off State Road 1303 approximately one mile north of Uwharrie community in the Morris Mountain section. The other is located two miles west of Mount Carmel Church on State Road 1146.

Camping will also be permitted at the former Uwharrie check station and at the Cove Boat Ramp as in 1972.

Under the Game Lands Program, habitat development has been accelerated. More old homesites have been reclaimed, grass fields have been fertilized and mowed and many miles of log-

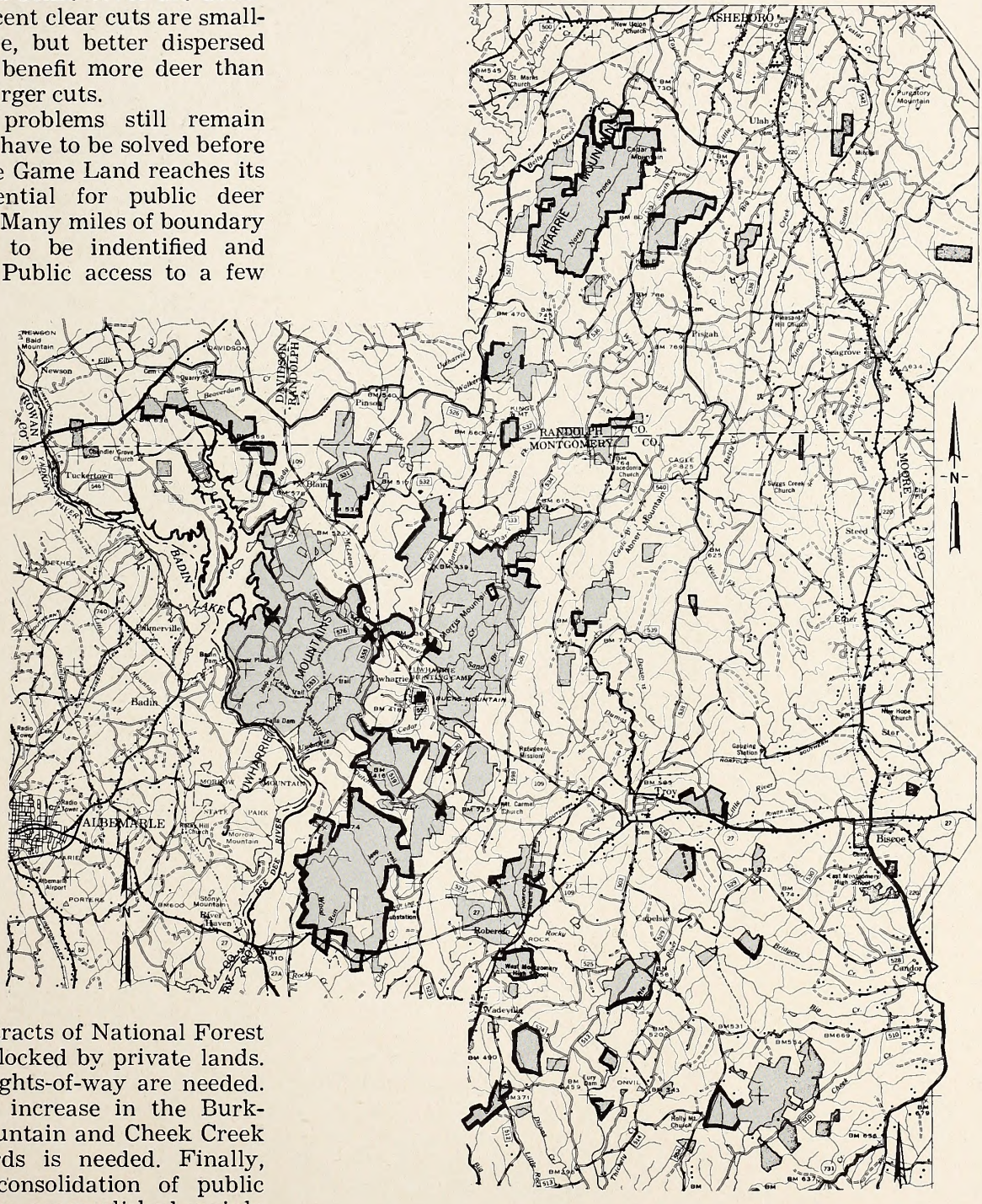
ging roads have been seeded with plants attractive to deer. Hunters will find deer concentrated in and around recent clear cuts especially those from two to five years old where both succulent foods and dense cover are abundant. Recent clear cuts are smaller in size, but better dispersed so as to benefit more deer than did the larger cuts.

Some problems still remain that will have to be solved before Uwharrie Game Land reaches its full potential for public deer hunting. Many miles of boundary line are to be indentified and marked. Public access to a few isolated tracts of National Forest land is blocked by private lands. Public rights-of-way are needed. Also, an increase in the Burkhead Mountain and Cheek Creek deer herds is needed. Finally, further consolidation of public ownership, accomplished mainly by land exchange, is needed.

We believe the above program, the result of cooperative planning and action by the Wildlife Commission and the Forest Service, will serve to disperse hunting pressure. We think it is a positive alternative to arbitrarily imposed quotas that would only lead to disappointment for many people who might otherwise have found a good place to hunt.

So, fellow hunters, spread out! And enjoy all of the 46,000 acres that are available for your benefit. If you are not familiar with some of these areas outside the old Uwharrie management area, why don't you try exploring them during the squirrel season these next two weeks. Then when the deer season opens, the chances are that you'll have a better place to hunt deer and more privacy.

Heavy lines around gray areas (Uwharrie National Forest) indicate marked boundary lines. All area is open to hunting, however. Campsites are marked X near center of map.



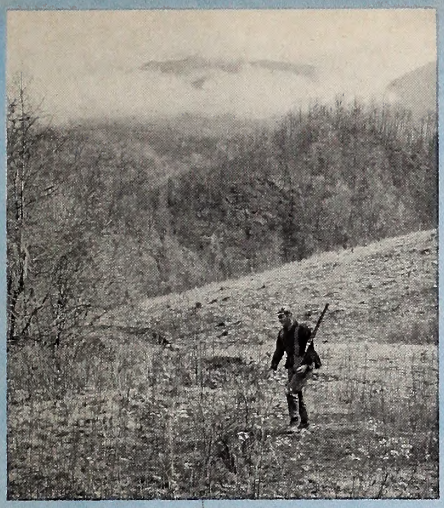
Woodlot Grouse

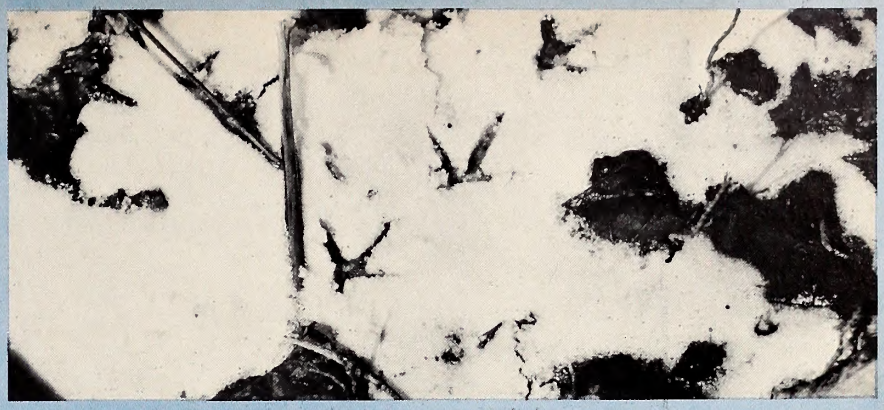
by Tom Monschein
Wildlife Biologist

THE dogs froze to a rigid point, and the hunters moved in closer for the anticipated flush. The silence broke with the thundering beat of wings and the echoing of shotguns. The grouse faded away untouched, but the enjoyment of the challenge in this single event would be instilled in the hunters' memories for a long time to come.

The sporting qualities of the elusive grouse are considered to be superior by many sportsmen. Knowledge of grouse habits, skill with a shotgun and physical endurance are all necessary elements of grouse hunting. These are only prerequisites, however, to enable first-hand experience in pursuit of the quarry. Veteran grouse hunters, who are honest, will tell you that they miss their mark more often than not.

Ruffed grouse can withstand an astounding amount of hunting pressure without endangering the breeding population. It has been demonstrated by numerous research studies throughout ruffed grouse range in North America that the amount of hunting pressure has little, if any, effect on recurrent pre-season grouse populations. Nesting success and the availability of appropriate food and cover are among the most important factors that determine the population status. Persistent rainy periods in the spring will usually result in a lower than normal fall population. Biologists are seeking to understand other variables that may affect grouse breeding success. In North Carolina and other southeastern states grouse populations fluctuate irregularly over the years, and a pronounced "cycle" cannot be distinguished as well as in the northern United





There's no denying that grouse hunting is a pretty strenuous sport. And unless you're ready for some uphill-and-down-dale hikes, maybe you'd better stick to reading about it! The closest some of us get is seeing tracks in the snow!

Game Biologist John Collins (left) and outdoor writer Lea Lawrence, discuss some strategy before tackling another wood lot. Are you sure it isn't time for lunch, John?

States and Canada, where a 10-year "cycle" is evident. The 10-year "cycle" implies that grouse populations build to peaks of maximum abundance at intervals of every 10 years in the northeast.

A three-year study of grouse populations in Alleghany and Ashe counties was recently completed with interesting results. The main purpose of this study was to determine the effect, if any, of hunting pressure on population trends of grouse in Ashe and Alleghany counties where a large percentage of the forested area is composed of small woodlots. These two counties have previously had a 90-day season as compared to the general 135-day season. Woodlots were selected in both counties to serve as study areas for the three-year period. Of the nine woodlots selected, three were closed to hunting to serve as controls, three were subjected to a limited amount of hunting and three were open to the public for maximum hunting pressure.

Pre-season and post-season flushing censuses were conducted on the nine study areas over the three-year period. The flushing censuses were conducted by the district game biologists with the use of bird dogs. Post-season censuses were compared to pre-season censuses to determine the reduction in the population over the hunting season. Pre-season census figures were used to determine the grouse population recruitment and increase by comparing them with the previous year's post-season census. In other words, the pre-season and post-season censuses were used to evaluate population changes over the hunting season and dur-

ing the reproductive period.

Grouse Movements and Population Trends

Factors affecting grouse movements are the availability of food and cover, daily habits, weather conditions and harassment. It was evident that these factors affected the population trends on the study areas during both pre-season and post-season censuses. Therefore, two pre-season and two post-season censuses were conducted on the study areas for each of the three years. The two consecutive censuses on each woodlot were conducted during different times of the day and were spaced several days apart under varying weather conditions. The greater of the two consecutive census figures on each woodlot was assumed to be nearer the actual number of grouse utilizing the woodlot dur-

Grouse dogs come in many patterns, but some of the best are those used almost exclusively on this mountain bird (left). The ruffed grouse is a handsome fowl (below) and a great prize for the hunter.

Not many places in our fair land that you can do this. (below) Even in the deep forests of North Carolina you have to know what you're doing and where you are.

It may not be much but man after a half a day of chasing those reddish-brown ghosts through the woods, even hot dogs seem like sirloin . . . well, almost . . .

TABLE 1. Grouse flushed from study woodlots in Ashe and Alleghany counties, 1969-1972.

Woodlots	NUMBER OF GROUSE FLUSHED							
	1969-70		1970-71		1971-72		Average	
	Pre-Season	Post-Season	Pre-Season	Post-Season	Pre-Season	Post-Season	Pre-Season	Post-Season
No Hunting (3)	10	4	7	5	7	5	8	4.7
Regulated Hunting (3)	8	8	15	4	6	2	9.7	4.7
Unrestricted Hunting (3)	3	1	1	1	4	6	2.7	2.7

ing the specific census period. Even with this allowance for undetected birds, the figures are believed to be minimal due to the difficulty in flushing grouse from thick cover and their tendency to slip away undetected.

Hunters too often have the tendency to hastily judge game populations by one or two hunting trips without allowing for the factors previously mentioned which cause natural movement. Where grouse are found on one occasion, they may be conspicuously absent on the next hunt. Also, the greater the hunting pressure on a grouse population, the more wary the birds become. Grouse are more elusive than many hunters realize, and persistent grouse hunters will vouch for the cunningness of this game bird. The availability of mast influences our ability to accurately judge the population status. In years of good mast production grouse tend to scatter throughout the natural range, thus making birds harder to find. During years of spotty mast production, grouse tend to concentrate in those areas where food is most abundant, thus making for good hunting if you are fortunate enough to find one of these areas.

Table I presents the results of the grouse flushing counts conducted on the study areas. Preseason counts were made in November prior to the grouse season in the area and post-season counts were conducted in February at the end of the grouse season. The results show that there was about a 50 percent decrease in grouse numbers over the fall and winter period on all areas regardless of hunting activity. The ability of grouse to recover from this annual loss is also demonstrated in the results, since the fall populations always recuperate from the previous year's low. Their high reproductive rate is responsible for this recovery. From this census information we can conclude that hunting, even in isolated woodlots such as these, has no serious or long-term effect on grouse populations.

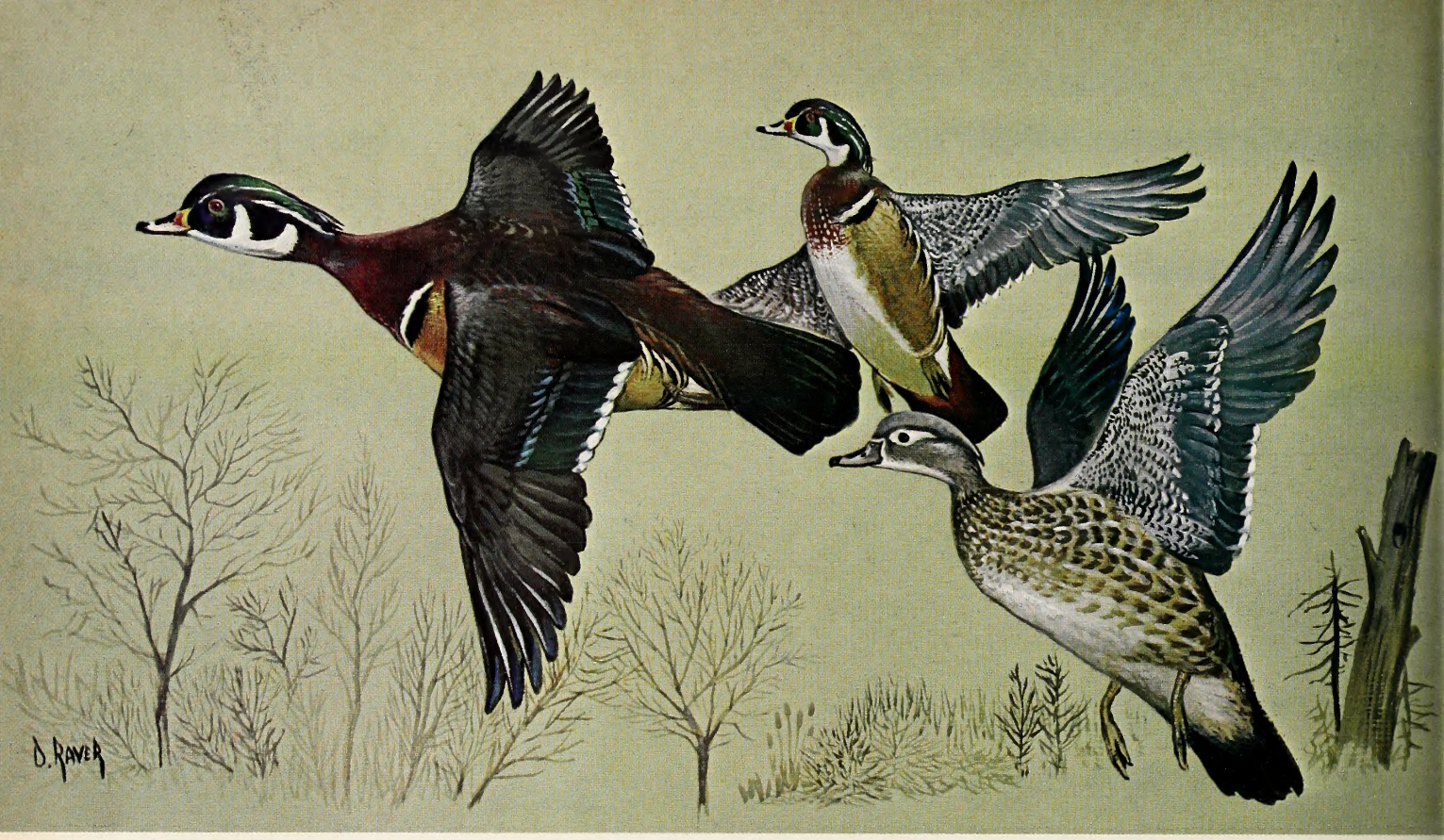
Hunter Success

Accurate flush and kill records were kept on the three woodlots which were subjected to regulated hunting pressure. The total of hunter hours, flushes and kills over the three-year period gave a combined average of 4.2 hunter-hours per grouse flushed and 45.5 hunter-hours per grouse killed. The information collected revealed that the combined average flushing rate and kill rate were approximately the same on the areas open to public hunting as they were on those areas with regulated hunting. These findings indicate that hunting pressure had little effect on grouse populations in these woodlots.

Population Recruitment

Grouse have the ability to replenish population losses that are incurred by natural causes and hunting. This was readily illustrated by the results of the study in Alleghany and Ashe counties. The study areas that received the most hunting pressure and had the heaviest kill were found to have the greatest recruitment rates and, thus, a greater capacity for sustaining adequate grouse populations with heavy harvests. The control areas with no hunting allowed and the regulated hunting areas had lesser recruitment rates than the heavily hunted areas. In fact, the total population on the study areas open to maximum hunting pressure actually doubled from the beginning to the end of the three-year study. A portion of this increase can be attributed to a natural ingress of birds into the woodlots from adjacent range, and a portion was due to the high reproductive potential of the grouse. It can be concluded that hunting is definitely not a detrimental factor in maintaining healthy grouse populations on small, isolated woodlots. Furthermore, the conclusion can be drawn that hunting pressure enhances the recruitment rate and is actually beneficial to grouse populations. This is further supported by the fact that the recruitment rate was found to be the lowest on the areas which were closed to hunting. Other studies have also shown that where hunting pressure is heavy the general population decline during poor years of reproduction is not as great as it is where hunting pressure is light.

The setting of hunting seasons and bag limits is an effective way of regulating the harvest of game. One of the primary objectives of wildlife management is to provide as much recreation to the hunter as possible without endangering the resource. The grouse is a valuable asset of North Carolina, and Tarheel sportsmen derive much pleasure in hunting this game bird. The Wildlife Resources Commission combined these facts with the results of this study when the decision was made to include Alleghany and Ashe counties in the general grouse season. Hunters in these counties can now enjoy six more weeks of this challenging sport without endangering the grouse population there.



WOOD DUCKS

JUMP DUCKS!

by Frank Mooney

WITH fewer ducks, more "club land" and less habitat for them to occupy, the dedicated duck hunter often has to hunt hard to find any waterfowl to bag. To belong to some duck clubs, the hunter has to pay some outrageous price, and often the working man cannot afford to join a club or pay a guide.

If you are a duck hunter that fits this group, don't throw in the towel, there are still places to bag ducks. Rivers, lakes, and farm ponds often harbor ducks that only a few hunters realize. Some ducks frequent an area all season without much contact with hunters. A farmer told me that he often heard loud noises at his pond during the night. The pond was 60 yards from his house, and several gangs of woodies were roosting there.

Those ducks came in after sundown and left before sunup. With some prescouting the hunter can often find places where ducks are roosting, feeding and spending the day preening and doing the things that ducks do. Walking along small streams or ponds with high banks is an excellent way to jump ducks. When farm ponds have low banks perhaps the hunter can approach the ducks from behind the dam. Drifting rivers in a small boat can produce some highlights of the day when you surprise a raft of mallards in the bend of the stream.

Stalking ducks in the marsh on foot appeals to some hunters. It can be the most exciting of duck hunting when things are clicking. Many ducks are shot as they are either leaving or entering a marsh, and the hunter stalking his quarry on foot can often get within a few feet before the ducks are startled enough to fly.

One year I located two farm ponds that harbored some green-winged teal, black ducks and a few baldheads. After getting permission from the owner, a friend and I proceeded to learn their itinerary. Most of the ducks fed in one pond and spent much of the day on the other. We didn't shoot them too often so as not to scare them away, and we enjoyed an action-packed season.

When you scout an area for ducks and fail to locate any, it doesn't mean ducks aren't using the spot. They use different spots for different things. Take for instance, a river I tried early one morning: With the same excitement of past seasons, I crawled into a wind-blown tree along the bank to await the stirring of wind through pinions. No ducks came. There was cover and tree mast along the banks, but no ducks, or so I thought.

Like we've said before, ducks are just where you find them. And you don't need to travel very far if you'll look around in some places that may be right under your nose. It sure won't hurt to look!

Sometimes later I was stalking squirrels along the stream when the sound of wings pulled my eyes skyward. There were ducks with cupped wings splashing into the same place I had waited with high hopes, and no ducks. It was 10 o'clock—those ducks were using this place as a noon-day rest area. By luck I found this place, and several days later after a late breakfast I had the makings of a duck dinner.

Hunting some of these areas without a retriever can produce a problem for the hunter in "fetching" his ducks. Taking a fishing outfit with a large top-water plug will solve your retriever problem. It's also a good way to sharpen up your casting arm. Often the hunter with waders can pick up his ducks in shallow water. Before I learned the casting trick, I had waited for the current or winds to drift the game to the shore, where I could reach it.

Many hunters don't realize that puddle ducks often feed in fields. I have seen black ducks, mallards, and wood ducks feeding in picked-over corn fields and bean fields. One day about 30 minutes before sundown, my uncle and I spotted a flock of about 20 ducks go down in a picked-over bean field. It was a large field with several hedgerows running through it, and in my haste I misjudged the distance and crawled up the wrong hedgerow. Those sharp-eyed mallards left me while I was flat on my stomach.

One morning after failing to find any ducks on a nearby pond, I started back to the car. I spotted two ducks overhead and stood puzzled as they dropped down into a large bean field. This was up in the morning and I couldn't understand what made those ducks act that way. My morning had been fruitless so I was game for a crawl. The vines were waist high, and due to wet weather the beans had not been picked; the going was slow. After a slow, hard crawl I came upon a flooded portion of the field. Peering through the vines I saw a duck leave the water and enter the field. The bean pods were dry and the ducks were really making them rattle. It was too much racket for just two ducks.

With my gun ready I waited crouched behind the vines until the ducks returned to the mud hole. What a surprise. Two black ducks flew back into the water with 15 green-winged teal in their wake. At the sound of the gun, one black crumpled, the other took a dip like a dove and the wad of shot whizzed harmless over his head. By then the air was full of teal. I swung on a speedster as it cleared the tops of the beans. It crashed earthward. Those butterballs can burn the wind.

Catching a flock of ducks flatfooted in a bean field is one of the highlights of a duck season. The unexpected often produces more excitement than ducks over decoys. At times ducks will inhabit an unexpected place. One day I flushed a wood duck drake in a small stream between two fields. The stream was a couple of feet wide and only inches deep. The ripple of the water gave him away.

Ducks have caught me flatfooted also. Like the time a good friend and I were hunting a tidal river on low tide. While waiting for the incoming tide—and hopefully ducks—we left the boat and walked through the grass looking for a blind to conceal ourselves when the area was flooded. My buddy almost stepped on a black duck. The loud quacks and sudden departure left him with an empty gun and great respect for a highland duck. He was between me and the duck.

Ducks when caught like this will often hide like quail and refuse to flush unless pushed hard. Some will hide in tall grass along the shore in only inches of water. Another memorable trip comes to mind. Another friend and I were almost to the car after a trip to the marsh, and lacked one duck having our limit. A wood duck was feeding in the flooded ruts of a grown-up logging road under some oak trees. The ripples he made while feeding told on him. That woodie drake was determined to stay there until he was almost mashed underfoot. The average duck hunter would be flabbergasted if he knew how close he came to some ducks without knowing it. If we hadn't noticed the ripple, the duck would have let us both walk within a few feet without flushing.

Floating a small stream I flushed two wood ducks. I shot one and the other dropped to the water almost within gun range and swam behind a huge tree at shoreline. After kicking leaves and brush along the bank I went to the other side and hid for 30 minutes. That duck just disappeared. It would have been worth $5 just to know where that rascal went. That stream was only 20 feet wide and open in most places.

Good memories that go along with duck and dressing is a good way to end a great waterfowl season. Here's an old fashion recipe that makes my mouth water just to mention it. Maybe after you try it, you will say the same thing. Four small or three large ducks, four cups soft bread crumbs, one cup crumbled corn bread, ½ stick margarine, ½ teaspoon salt, ¼ teaspoon pepper, three eggs and broth from ducks. Cook ducks until tender (about 45 minutes for wood ducks, longer for larger ones) in pressure cooker. Crumble bread and corn bread together, salt and pepper to taste. Add butter and broth and stir until well mixed. Set aside with cover on bowl for five minutes. Add eggs and mix well. Pour into buttered dish and cook until golden brown.

Let me know if you like it . . . .

Jaeger und Wild-Hunting in Germany

by Sarah S. Robinson

Photos by Rhodes and Sarah Robinson

Conclusion

Some of the game is hunted from a Hochsitz similar to this snowy one. This really is considered the "tamest" type of hunting, but it can be quite effective.

Last month we looked at many interesting facets of German hunting, the game and where it is hunted, some of the laws of theirs that seem a little strange to us, and a few of the problems of the game manager. Perhaps we can learn from the Germans who really are confronted with plenty of problems.

The aim of improving the German game expresses itself in another management practice, also, one that we try to avoid in this country—winter feeding. The original German game laws didn't advocate feeding, but since then many of the broadleaf forests have disappeared. They were replaced by needle trees and game food is scarce.

Supplementary feeding has four benefits: It keeps up the population, prevents damage to crops or forests, improves the trophies, and provides a good census. Hunting rights holders must feed their animals in Germany. If they don't do it on their own, the game authorities can buy food, feed the animals, and send the leaseholder the bill!

It's amazing to see red deer stags run down from a snowy mountain to the *Wildfuetterung* when they hear the "supper call." And I am inclined to admire more the stubborn chamois who refuse to come to the hay.

When it comes to types of hunts, the German hunter has three choices. The tamest is to sit for game, waiting in a *Hochsitz* until your animal comes along. Since the foresters or keepers build the stands near the animals' trails or feeding areas, you are almost certain of getting a shot. The animal is less likely to catch your scent, too.

Stalking is the method for real adventure, especially in the Alps. Of course for some species, like the grouse and the chamois, stalking is the only way. Usually on a big game hunt there is a hunter, his guide, and a dog. The hunter's permit will allow him to bag one specific class of animal, and sometimes the guide will have one particular animal in mind that he knows will meet the requirements. This is especially true with the deer species. The hunter is not always allowed to shoot the best buck he sees.

In Germany drive hunts are the most varied; they may be square, circular, or L-shaped, loud or quiet, in the forest or in shrubby areas. One thing they have in common is that only small game and wild boar are taken, no deer.

Hunting in Germany is a safe sport. For example, in 1971 there were no serious or fatal accidents among approximately 200,000 hunters.

One regulation is strongly enforced despite the tears from gun lovers over "ruined stocks": Guns must be equipped with a sling. European guns come with the rings for the sling already mounted. Slings are convenient for carrying a gun on long hikes and make hunting safer.

CUSTOMS

The customs that surround the European hunt are useful. They work for the safety and enjoyment of the hunters, they enforce sportsmanship, and they give deserved dignity to the animals.

Hunting without observing this first custom is actually dangerous—your invitation to hunt must be in writing. Poaching is a serious offense. You might find yourself in a stand and separated from your host when an official appears and wants to know what you are doing with a gun on Herr Schmidt's land!

But most of the customs are more light-hearted than that one.

Branch signs play a big role in hunting. For these a small branch of one of five native German trees may be used, either oak, alder, pine, fir, or spruce. The ownership branch lies on the left side of a slain animal so that it covers the wound. The larger game are given a branch known as the "last bite"; a sprig is placed in the animal's mouth and as another last respect the hunter then sits on the ground near the animal for a few minutes before dressing it. (This death watch probably lasts just long enough for the hunter's heart to stop pounding!)

For the prestigious game the successful hunter gets to wear the shooter's branch. After the kill the guide or leader of the hunt dips the branch in the animal's blood, places it on his knife, and presents it to the hunter with the word *Waidmannsheil.* The hunter accepts the branch and can wear it in the right side of his hat for that one day. If he is using a dog, the dog wears a sprig from the branch in his collar.

Drive hunts are social events from beginning to end, and an invitation to one means that your host will entertain you for the day, including two meals.

The drive hunt begins as the sportsmen gather at the first signal of the hunting horn and observe a moment of silence for their hunting friends who have died. The leader gives instructions on what may be shot and how the drive will be conducted. The bugle signals beaters and hunters throughout the hunt.

When the drives of the day are ended all of the game are placed in a *Streckelegen* or game parade. They are lined up lying on their right sides in specific order—first the boars, then the foxes, followed by the rabbits, pheasants, and other birds. The best specimen is put at the head of his group. When all is arranged the hunters, empty guns on their shoulders, line up on one side of the game beside the master of the hunt. On the other side stand the buglers, beaters, and handlers with the dogs. The horns are ready to blow the final respects for the game. There are calls for each group of animals; then comes "The Hunt is Over."

The "last drive" or *Schuesseltreiben* is a time for reliving the whole day, for toasting congratulations to the successful, for initiating new hunters, and for holding kangaroo court to try anyone who made even a tiny mistake. This jovial get together at a hunting lodge or small restaurant is the highlight of the day. If a hunter can't stay for the *Schuesseltreiben,* he politely refuses the whole hunt. And the night wouldn't be complete without the hearty hunting songs, some dating back to the days of the medieval courts. One is *Ich Bin Ein Freier Wildbretschuetz,* "I Am a Free Hunter." In those old days that was a real accomplishment.

THE GAME

Hochwild, the game of the nobility, have met various fates since the times of the royalty, but the German *Jaeger* seeks it as avidly today as the princes of the past did when the takes numbered in the thousands.

The red deer today, as always, holds first place in hunters' hearts. He is strong, agile, well-shaped, and his senses are keen. The red deer prefers hilly, wooded country with plenty of water, and a man with a herd on his hunting area protects them carefully. It takes a good 10 years for a *Kapitaler Hirsch* to develop his trophy.

Supplementary feeding and selective shooting experiments began for the benefit of the red deer. Also, in the last 100 years the larger Hungarian deer have been imported into some areas. But the German deer of today are still not as large as they were in the sixteenth and seventeenth centuries.

"Rabies!" announces a sign outside a German village. Apparently nothing for real alarm, but a warning that must be posted when the ailment shows up among domestic or wild stock.

The fallow deer is also *Hochwild,* even though it is not native to Germany. He is identified by a black stripe down his back and white flecks on his sides. He is smaller than the red deer. His palmate antlers make a beautiful trophy, but he is not hunted extensively because he lives only in northern Germany and finding a good male is difficult. The fallow deer thrives in parks and small woodlots, causing many hunters to treat him with disdain in spite of his beauty.

The mouflon, a species similar to our western big horn sheep, is native to the islands of Sardinia and Corsica rather than the European continent. They are established in some of the state forests, not in the Alps as one might expect, but in the lower ranges of central Germany. In their native lands the main natural enemy was an eagle, so when they are in open areas they look up for danger. Waiting in a *Hochsitz* for one is impossible, so hunters approach them in jeeps and take advantage of the mouflon's curiosity. The sheep's horns are called *Schnecken,* meaning "snails."

Germans love their chamois. Many of the daring *Jaegers* who have hunted him over the centuries have given their lives in pursuit of his *Bart* and *Krickeln,* either falling down an alpine cliff or being shot for poaching on some prince's preserve. The mountain people say that gnomes and pixies guard chamois, and that when a hunter gets too close, they can loosen the pebbles under his feet and send him tumbling to his death.

Chamois don't like to live near man. With their hind legs two inches longer than their front, they can scramble up rock cliffs that offer nothing more than a shadow of a ledge. They are often found above the tree line where they feed on mosses and lichens.

Their most deadly enemy comes from their physical environment—avalanches; an entire herd can disappear in seconds.

The chamois has true horns *(Krickeln)* which never are shed but add a ring each year. His *Bart* or beard does not grow under his chin! Along the ridge of an old male's back grow long, coarse hairs that are dark with light tips. The hunter carefully

snips off each one and has them mounted into a brush that he can wear in his hat on special occasions. The *Bart* is at its peak in November, leading hunters to risk snow and other dangers by putting off their hunts until then. Wearing a *Bart* that someone else won is unspeakable, worthy only of a tourist.

There is no limit on the number of wild boar that can be shot in West Germany. On the males there is not even a closed season, so they provide much sport. Often they keep an unlucky deer hunter from coming home empty-handed. Boar and red deer both like muddy wallows and are found living close together. Boar can be shot from stands or on drive hunts, and landowners try to keep the population low because they do much damage to agriculture.

The male boar's lower tusks are called *Waffen* or "weapons" with reason, since he can bring havoc to a good pack of dogs if he catches them in a thicket. The boar is the one hoofed animal that can receive a finishing shot and still keep coming.

Many American hunters have had experience with the capercaillie or *Auerhahn,* one of the alpine grouse. In Germany the limit is one-per-lifetime, but that one provides memorable hunting. During the mating season, also the hunting season, your guide locates a male with hens. He calls you to come immediately. By that night you have driven south, found your guide, and moved into the hotel or hut nearest your goal. Long before dawn you start up the mountain. An hour and a half before sunrise the *Auerhahn,* in a tree, starts his love song; there are periods of from two-to four-seconds during his hissing that he is deaf. The trick is for you to gain enough ground during his deaf period to spot him, get in position, aim, and shoot. Of course when he is not singing, you don't even put your foot on the ground if it is not already there! You must shoot before the sun comes up and he flies down to where the hens are. He is legal game only in the tree. If you shoot without making a clean kill, you and your guide search the area thoroughly. One feather or one drop of blood on the ground and that is your once in a lifetime bird! If you don't get to shoot at all you can stay in the area as long as your guide is willing and your money holds out.

The golden eagle is still considered to be *Hochwild,* but today it is an endangered species and is totally protected.

The *Niederwild* is the category of the small game in Germany. These are the animals that were numerous enough in the centuries of the nobles that they presented little challenge or excitement.

The roe deer, the only cloven-hoofed animal in the group, is the great pet of German hunters. It is the only deer there without a tail. The male is less than three feet tall at the shoulder and weighs only about 40 pounds, but he has a nice trophy and is the most sought-after game in Germany. He is accessible because he lives in open fields, orchards, and small woods throughout central Germany, often mingling with domestic animals.

The *Birkhahn* is another alpine grouse with a one-per-lifetime limit. Hunting him is similar to hunting the capercaillie, but the *Birkhahn* lives even higher in the mountains, right at the timber line. He loves miserable weather. Instead of flying down from his perch at sunrise, this fellow leaves his hens and flies up, so he must be shot on the ground.

The other *Niederwild* mammals are the fox, the number one predator on small game and known as the "forest police;" the martens; the hare; the rabbit; and the badger. In German the badger is known as the *Dachs,* and the familiar short-legged *Dachshund* or "badger dog" was developed for chasing him from his burrow.

The remaining small game are birds. The ring-necked pheasant and the Hungarian partridge live in the United States now since being introduced. The other German game birds are the snipe, woodcock, ducks, geese, doves, raven, crows, and rook. Most of these birds have close relatives in our country, and rarely members of the European species stray as far as our east coast. Keep that in mind if you shoot a giant woodcock this fall!

Songbirds are protected in Germany just as they are here.

Surprisingly, squirrels are not hunted in Germany. Their red squirrel, *Sciurus vulgaris,* falls into an unprotected group of animals. They can be shot, if anyone feels inclined, but squirrels are not managed as game animals.

CONCLUSION

The difference between hunting in Germany and in North Carolina is vast. The German hunting customs were over 600 years old when our country was first being explored. These customs are still followed, bringing all of their quaintness to a country just as fast-paced and modern as our own.

The German hunting laws developed from a situation completely foreign to us, a system that involved nobility and feudal lords controlling hunting.

The German system is not intrinsically better than ours. We do not like to think of making hunting regulations more restrictive. We do not want to resort to full-scale game feeding. We want our game wild and dignified—animals capable of coping with the environment on their own. Often, to be truthful, we envy their freedom.

However, our population is growing and our urban areas are expanding. Eventually we must make some compromises, some adjustments in our hunting system so that our large number of people can continue hunting at all.

When the time comes, I think we would be wise in studying the already-established German system. There we would learn to cope with less than ideal conditions without losing the best part of hunting —the enjoyment of the outdoors, the fellowship of other hunters, and the appreciation of our animals.

NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Wildlife Commission Hunter Safety Program Selected

The Hunter Safety Committee of the International Association of Game, Fish and Conservation Commissioners at its September meeting selected North Carolina as having one of the top ten hunter safety programs in the Nation. Competition is keen, and this is quite an honor for our State's program.

Eno River Calendar

The Eno River Valley Association is offering its beautiful calendar again this year. Filled with legends and scenes of the historic Eno, the calendar costs $2.00 plus 50 cents for mailing. Write Mrs. Faye Garrard, 4349 Sterling Drive, Durham, N. C. 27705. All proceeds go to the effort to preserve the Eno River.

Cooking Wild Game?

The National Rifle Association, 1600 Rhode Island Ave. NW, Washington, D. C. 20036 has come out with a booklet, "Wild Game Cookery," to help the hunter make the most of his quarry. Check with the Public Relations Department of NRA for a copy.

Motorboat Registration Renewals

Very soon now, motorboat registration renewal forms will be sent to motorboat owners who have boats registered with the Wildlife Commission. These should be filled out and returned with the $3.00 fee as soon as possible for processing.

Hunting Season Underway

If you go hunting, have your proper license and/or permit, be extra careful with firearms, respect the property of others, and obey the hunting regulations. You'll really have more fun that way. And remember, there is no open season on fox squirrels.

Hunter Safety .... Or Else

by Danny West
Asheboro
PHOTOS BY TOM ROLLINS

"I didn't know it was loaded!" "I thought it wouldn't go off if the safety was on!" "I was only foolin' around when I pointed it at him!" The excuses go on and on, ad nauseum. The wildlife protector writes the information down on the hunting accident report and sends it to Raleigh. He spends the rest of the day checking licenses and investigating reported violations. However, the flimsy excuse given to him on the hunting accident investigation keeps cropping up in the back of his mind. He wonders why this sort of thing happens.

It all boils down to two reasons, carelessness and ignorance. Hunting accidents caused by carelessness happen the same way that accidents around the home and on the road happen. People know the safe way to do something but they disregard this to save time or because it causes them some inconvenience. Those accidents caused by ignorance are as bad. People just plain do not know how dangerous the firearm they are using really is. What is the solution? There is no 100 percent answer to all gun-associated accidental deaths and injuries. However, public hunter safety education is one option that we have at our disposal to try to prevent these accidents.

In January of 1972, the North Carolina Hunter Safety Program became a reality, and now trains approximately 1200 students per month. The course provides a minimum of four hours of instruction in hunter safety, first aid, survival techniques, sporting ethics, wildlife management principles, and archery safety. Forty-nine out of 50 states in the U.S.A. have a similar course, some initiated as early as 1940. In recent years, 18 states have made the passing of such a course mandatory in order to purchase a hunting license. As yet, N. C. has not passed such legislation, but it may be coming. The course in one state is honored by all other states in a reciprocal type of agreement since the courses must meet Federal specifications.

How do you get a hunter safety program started in your area? There really is not a great deal involved if the interest is already there. Here is how we set up ours.

Mr. Joe C. Story, Jr., Wildlife Protector assigned to Randolph County, and I were discussing a hunting accident at the Butner Game Lands that took the life of one of our high school students. We also had another area resident injured at Hoffman. I am an Attendance Counselor for the Randolph County Schools, and I have been an avid outdoorsman just about all of my life. There is a great deal of hunting activity in the Uwharrie area, a part of which is in Randolph County. Since this is public land, there is a good deal of use of this land, and a concentration of hunters. So far, Joe had only been able to work with small groups in a hunter safety program. The masses were still escaping us. We decided to explore the possibility of instituting the program in the public schools.

We started working on this project in March of 1973. Several factors were involved that would make or break the program. (1) Would there be sufficient interest in the program? (2) Would enough teachers volunteer to serve as instructors? (3) Would the course be accepted by the public as a beneficial safety program?

We began by discussing the program with the school administration, the principals, teachers, and citizens. The idea seemed worthy to them. We then surveyed our junior high school teachers. Sixteen volunteered to be trained as instructors.

Then we surveyed the students. We anticipated maybe 500 would sign up. They were reminded that the program was completely voluntary, and anyone who did not want the course did not have to take it. We were astonished when 1200 signed up in just 10 junior high schools!

Complete hunter safety instruction includes many basic information items such as the power and range of various types of ammunition. Danny West points out different shotshell loads to students.

It has been demonstrated in North Carolina and nationally that a trained hunter is a safer hunter. Hunting can be a safe sport.

In some cases 100 percent of the student body signed up. Everything looked okay, so we started.

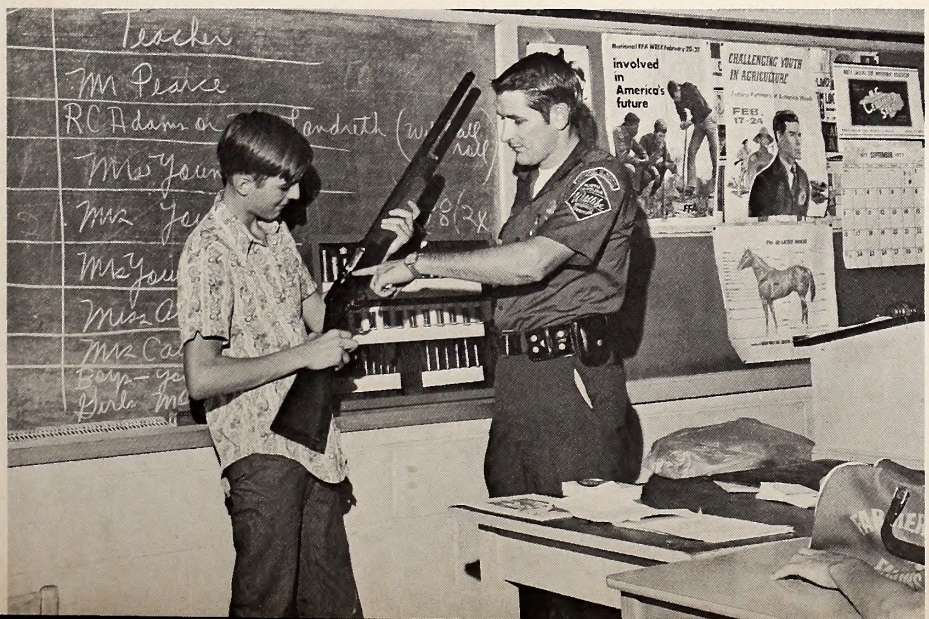
Mr. Richard Jarrett, Hunter Safety Officer in our area, came to Asheboro in early April to qualify our teachers as instructors. Since these folks are knowledgeable in teaching methods, they adapted quickly to the material and were very enthusiastic about getting started. The first courses began in late April, after Easter Holidays, and we have been running around ever since trying to keep the teachers supplied with enough materials. We use the course as an interest-type supplement to a Physical Education or Occupational Education class. We do not involve the English or Math teachers since this is not related to their subject matter.

Some people shy away from a safety program because they are afraid that it will be dull and that they will lose the interest of the students. That is not the case with a hunter safety program. Your imagination is your only limitation. We improvise a lot of materials and props. Our instructors have made guns out of wood to use in safe handling demonstrations, shot pieces of plywood with shotguns to show how much penetrating power they really have, used pieces of sawed off barrels to show rifling, glued shotshell components to plywood, and utilized films and other materials supplied by the Wildlife Resources Commission and the National Rifle Association. All such materials are fine, and there is no cost to the student.

At the end of the course of instruction, the students are given the official North Carolina Hunter Safety Exam. Most of our students miss only one or two questions. This is as good or better than some adults have done on the same exam. However, we do not recommend the course for children under 12 because some of the subject matter is on high school level. We gave the test orally to a few students who have difficulty reading, and they used their common sense and made 95 to 100 percent on their scores.

The course is designed to be taught by one person, but a helper or special guest instructor surely helps. Policemen, wildlife protectors, and wildlife biologists are good resource people. Joe and I usually teach a class together, so if one forgets something the other one remembers it and talks about it later. This is especially helpful in the Safe Handling section of the course.

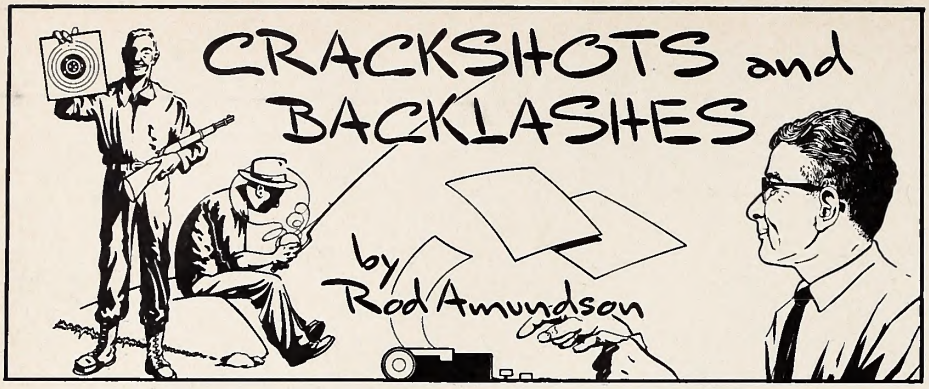
Wildlife Protector J. C. Story, Jr., shows the features of a shotgun to a hunter safety student. A thorough knowledge of the firearms to be used is essential to safe hunting.



It is too early to tell just how successful our program has been in preventing accidents. The interest was good and the exam scores were high. Only time will tell if we reached our objectives. Our hope is that Randolph County will come through the 1973-74 season with a clean record. No magic tricks are offered to prevent accidents, just plain common sense. There are still a lot of hunters who have not had the course, and we will keep trying to reach them.

Other areas that you might wish to explore for possible hunter safety courses are boy scouts, girl scouts, 4-H clubs, summer camp programs, civic clubs and ladies' clubs. That's right, I said ladies' clubs. Women make excellent students, probably because they will ask questions when they don't understand something. Men just sit there like a knot on a log. Women with husbands who hunt or target shoot also need to know how to handle, examine, and store firearms to prevent accidents around the home. If you wish to set up such a program in your school system, boy scout council, girl scout council, hunting club, or civic club, contact your local wildlife protector, hunter safety officer, or the North Carolina Wildlife Resources Commission, 325 N. Salisbury, Raleigh, N. C. 27611, Hunter Safety, for information.

North Carolina is a great state for hunting and other outdoor recreation. More and more, people will be participating in these activities in the years to come. So the Wildlife Resources Commission will be working harder to improve present habitat and facilities. While they are doing that, let's give them some help by voluntarily becoming safer hunters. ▲▼



WILDLIFE Magazine seldom uses unsigned letters, but decided to include this one and hopes that it is authentic.

Dear Sir:

I read with interest Charlotte Green's article on Texasgulf, Inc. appearing in the September issue of Wildlife and I agreed with "the scientists that are yet apprehensive."

I'm sure Texasgulf is restoring and preserving, but why are the trees near the plant dying, and I assure you they are dying! And why can't measures be taken to eliminate the acid fumes that cause nose bleeds in the employees who have to work in confined areas?

Conditions have improved greatly over the past several years but there's room for a great deal more that will not come as long as parts of the plant are shut down or labelled 'Top Secret' or 'Restricted' when air pollution authorities are expected. Word of their arrival is known in plenty of time for preparation.

A lot of people in our locality owe a good living to TG, Inc., my husband and I included, but a lot of things are covered up known only by the employees that are afraid to speak up because of their jobs.

Cooking Wild Game?

What is described as "the comprehensive guide for handling and preparing the world's finest meat" has been written and compiled by Jack McCready. The 71 page book is entitled "Furred and Feathered Wild Game From Bullet to Table", and is available from The Powell Co., Drawer 5975 Biltmore Station, Asheville, N. C. 28803.

Endangered Species

Dear Sir:

We read with interest the letter by Dr. Darrell E. Louder in your September issue. In most respects this was an excellent letter and we were pleased to record his observations on the endemic fish species of Lake Waccamaw. There is one point of clarification, however, that we would like to comment on.

Dr. Louder's discussion of the American alligator was quite accurate except for one point. His statement that the principal decline of the alligator is due to habitat loss is true only in the sense that most wildlife populations have declined as habitat has been converted for other human uses. The alligator's populations have been additionally depleted, in the habitat remaining, by illigal hunting. The resurgence of the species in areas with effective management and conservation programs is testimony to the damage that poaching can do to a commercially valuable wildlife resource. There are still today large areas of suitable alligator habitat in the southeast with few or no alligators. The Department of Interior is committed to restoring the alligator populations to non-endangered status throughout its range wherever suitable habitat still exists.

Sincerely,

Keith M. Schreiner, Chief,
Office of Endangered Species
and International Activities
U. S. Dept. of the Interior

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KNOW YOUR PROTECTOR

Robert S. Wright

Robert S. Wright was born September 6, 1944, in Edenton, N. C., and is the son of Mr. & Mrs. Rupert E. Wright.

Mr. Wright attended John A. Holmes High School in Edenton, N. C., and graduated in 1962.

Prior to his employment with the Wildlife Resources Commission, Mr. Wright was employed with Weyerhaeuser Pulp and Paper Company in Plymouth, N. C.

Mr. Wright completed the preservice training school for wildlife protectors in July of 1966. He was employed as a wildlife protector trainee on October 1, 1966 and stationed in Manns Harbor. February 1, 1967, Mr. Wright was transferred to Greenville, N. C. as a wildlife protector. January 1, 1972, Mr. Wright was promoted to wildlife patrolman and transferred to Roanoke Rapids, N. C. Since his employment with the Wildlife Resources Commission, Mr. Wright has completed seven inservice training schools at the Institute of Government in Chapel Hill, N. C.

Mr. Wright is a member of the N. C. Law Enforcement Officers Association, State Employees Assoc., Southeastern Association of Game and Fish Commissioners, N. C. Association Wildlife Law Enforcement Officers and The Halifax County Lay Association. Robert is a N. C. Resources Commission Hunter Safety Instructor.

Mr. Wright is married to the former Phyllis Boucher of Edenton, N. C., and they have three children: a daughter, Kelly, age 6½; and two sons, Robert Jr., age 3½ and David, age 1½.

The observance of National Hunting and Fishing Day last September included this presentation of two recent books on Wildlife to the State Library. Accepting "The World of The Wood Duck" by Jack Dermid (right) and Gene Hester (not present) and "The World of The Gray Squirrel" by Dr. Fred Barkalow (second from right) and Monica Shorten (not present) is Lt. Governor Jim Hunt (second from left). Charles Shaw (left) represented The N.C. Wildlife Federation of which he is president.

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IN NORTH CAROLINA

N. C.
Doc.

PHOTO BY JIM LEE

Winter

When dead leaves hang from weeping trees
And orbs of life are set
To lose the glow of summer suns
And in frost-breath is let,
Then Winter in her frilly gown
Of satin-silky white,
Descends upon the halls of man
And settles on the night.

The trees of youth and old alike
Are set upon by snow.
Then laden down, bent to the ground
They tell them what they know.
Satisfied, the crystals fall
A cavalcade of rain,
Melted by a winter sun
Somber, still and plain.

But Winter in her fury,
Is not a once-tamed pet.
She strikes again with shrieking winds
And rainstorms cold and wet
That freeze into an icy tomb;
Touch of death by devil's paw
To all those 'neath the coffin's lid,
And only Hope awaits the thaw.

Ice-strewn fields of Winter's haste
Are proof unto the day,
That she must show with her full strength
Her power held at bay.
Lord only knows what she might do
If given time or place.
Why, she might rend asunder
The universe and space.

Pushing through the crust of ice,
One tiny blade of grass,
And red birds sing the birth of Spring,
For Winter is now past;
But Winter smiles through all her tears,
A master at the helm,
For it is plain, she will remain
Queen of the frigid realm.

Charles Swanson

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Raleigh

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WILDLIFE IN NORTH CAROLINA recognizes the need for close cooperation between State and Federal conservation agencies and the people who hunt and fish—to bring about a restoration of our renewable resources. The Editor gratefully receives for publication news items, articles, and photographs dealing with the North Carolina out-of-doors, but reserves the right to reject materials submitted. Full credit is given for all materials published.

Have you moved recently? Change your address promptly. Either send in an old mailing label from your magazine along with new address or type or print complete old label information exactly as it appears on your magazine.

WILDLIFE IN NORTH CAROLINA is published at the Wildlife Resources Commission offices, Albemarle Building, Raleigh, N. C.

* * *

Second class postage paid at Raleigh, North Carolina 27602.

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SUBSCRIPTION—One dollar per year, two dollars for two years. Add one dollar for overseas postage except APO and U.S. possessions. Make remittance payable to WILDLIFE RESOURCES COMMISSION. Any employee of the Wildlife Resources Commission may accept subscriptions, or they may be forwarded to "Wildlife" Albemarle Bldg., 325 N. Salisbury St., Raleigh, N. C. 27611. Stamps cannot be accepted.

Wildlife circulation this issue 99,720

Wildlife IN NORTH CAROLINA

The official publication of the NORTH CAROLINA WILDLIFE RESOURCES COMMISSION, Raleigh 27602. A monthly magazine devoted to the protection and restoration of our wildlife resources and to the improvement of hunting and fishing in North Carolina.

VOL. XXXVII, NO. 12 DECEMBER, 1973

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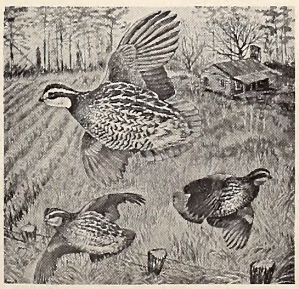
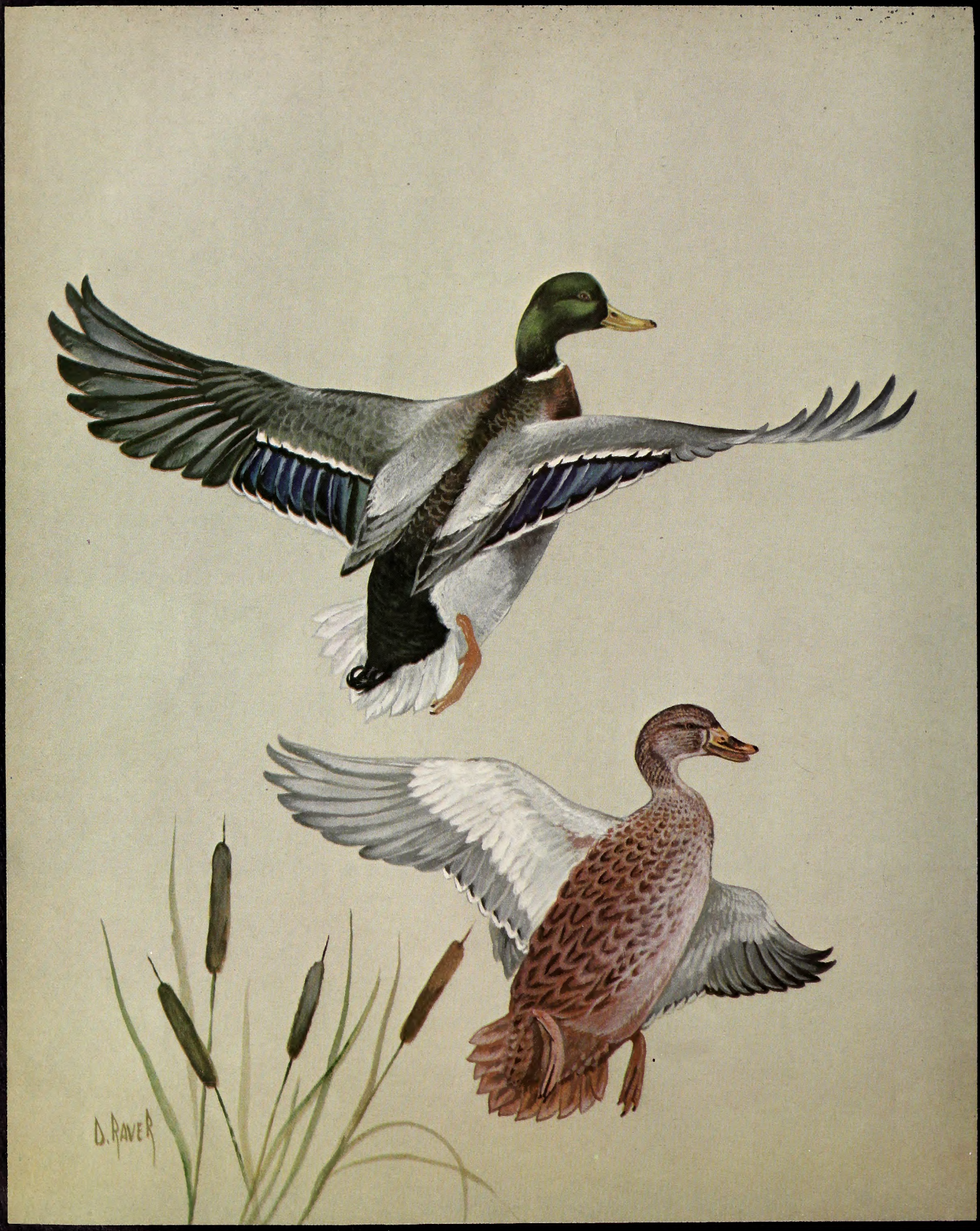
TED DOSSETT _ _ _ WRITER-PHOTOGRAPHER
ROD AMUNDSON _ _ CONTRIBUTING EDITOR

An objective of all levels of government should be to achieve and sustain a balance of the social, ecological, and economic benefits derived from natural resources. Without such balance none of the factors on the scale will be worth weighing.



Sometimes quail will sit tight and wait until you're well past them before exploding from the fencerow. The next time they may get up "wild." way ahead of you out of range. Some hunters will tell you that the habits of bobwhites have changed over the years, and the birds seem to be getting wilder; maybe they're just getting smarter! Painting Courtesy Mr. and Mrs. W. L. Fulcher, Cary, N. C.


D. RAVER

The Mallard

by Dane Hill
Pleasant Garden

SUDDENLY you hear a flock of ducks approaching in the crisp, early morning sky. Run and get your binoculars for this may well be a flock of "greenheads" arriving to spend the winter with us here in North Carolina!

Anyone who has seen one of these mallards **(Anas platyrhynchos)** will always remember it, especially because of the drake's magnificent plumage. It consists of the green head which sometimes turns blue and purple as the sun's rays hit it, a white neck ring, a chestnut-brown breast, and usually orange feet (depending upon the time the duck stays in the water). Like most birds, the female mallard is a drab colored dark-brown; a color which helps protect her from predators during the nesting season.

The beauty of the wild mallard's plumage is not always appreciated because it is often associated with its barnyard decendants. These decendants include the Rouen, white Pekin (this bird can sometimes be a nuisance to have around), Indian Runner, the call ducks, and a few others. In North Carolina and many other states, sportsmen have placed the mallard near the top of their list of preferred game birds because of its wide distribution, abundance, size, and of course its excellent taste. Naturally, the most satisfying flavor escapes only when cooked by an excellent chef.

Mallards winter in the brackish estuaries of southeastern Alaska as well as in the Great Lake States. Over a million mallards have been recorded at Christmas in the Fort Randall Reservoir in South Dakota. Winter flocks numbering many thousands occur along the Gulf Coast and in the Mississippi River Valley.[1] Many of these beautiful birds also winter here. A majority of them are usually located at Gaddy's Goose Pond in Ansonville, North Carolina. This lake has become very well known because of its extremely large population of ducks and geese. Many of these waterfowl also spend some time on many of our private lakes. Of course, the more you feed them, the larger their numbers will be in the future.

In early spring, as soon as the ice melts on the northern sloughs and potholes, many thousands of mallards migrate back to these nesting grounds. When they arrive in a suitable nesting area the drakes start trying to win a mate. The proud drake fluffs out his head feathers, raises his head and tail with quick jerky motions, stretches his head out low over the water, and swims rapidly around about the shy female. If she accepts him she will touch him with her bill and will give a few rapid short-syllable quacks. Very often vicious fights occur among the drakes. Fortunately, the general outcome is only the loss of a few feathers and the pride of the losing drake.

After the female selects her nesting site the drake will establish his territory and drive off any trespassers.

First the female surveys all the undergrowth in the immediate area. When she finds a spot that suits her, she will dig out a depression with her feet. Very often she will leave this one if the ground is hard or rooty, or if she is disturbed. After the depression is dug, she will lay her first egg, but sometimes she will wait until the following morning. Next she lines her depression with grass, weeds, down and feathers, and anything else that appeals to her taste. The reason that she pulls out the down and feathers from her breast and under body is because the eggs must touch the skin on her stomach (brooding patch) to get the necessary warmth they need. Everytime she leaves the nest she pulls these materials up from the edges and over the eggs like a blanket. This serves to enclose heat and to conceal the eggs from predators. Through my observations, I often find a lazy female that doesn't do this. The usual outcome is destruction of the nest and eggs.

Her first clutch usually contains from eight to twelve greenish-blue eggs about the size of an ordinary hen's egg. However, if the hen is semi-domestic, and is fed, she will lay up to 16 eggs. If the first nest is destroyed by predators, floods, and unfortunately, man, she will lay another clutch containing six to eight eggs. As soon as she starts her long and nerve racking 28 day incubation period, the drake abandons her, eventually moults into his eclipse plumage, and loafs around with the other drakes for the remainder of the summer.

The very tiny and precious ducklings are dark brown with a pattern of yellow patches over their bodies. Within a day after hatching, they are able and eager to follow mother into this brand new world. These ducklings are very enjoyable to look at as they get excited and dart over the surface of the water. When mother calls they actually run on top of the water to get back to her. Sometimes they find an insect and start a "tug

• **continued on page 25**

1. Oliver S. Owen, *Natural Resource Conservation, An Ecological Approach* (New York, The Macmillan Company, 1971).

Central Game Lands

This is the second in a series of articles describing the Wildlife Commission's Game Lands. These areas are open to public hunting during the regular hunting season. A special Game Lands permit is required to hunt these managed lands.

By Rod Amundson

THE cry of "Tally Ho!" usually is attributed to Jolly Old England, but sometimes it can be heard on one of North Carolina's Game Lands where fox hunters ride to hounds—more or less in the traditional manner; but more of that later.

North Carolina's Central Game Lands coincide almost exactly with the physiographic region known as the Piedmont. Its general configuration ranges from flat farmlands to rolling hills of the central Piedmont to the foothills of the Blue Ridge Mountains.

This is the most densely populated section of the state, and as a result of an ever-growing human population and the spread of urban, suburban, and industrial development the demand for more public hunting and fishing territory has increased over the years.

As is the case with most of the eastern two-thirds of the state, there is a mixture of farmlands with pine and hardwood woodlands. Three major river systems, Catawba, Yadkin, and Haw, run through the area. The Catawba and Yadkin Rivers have a series of power reservoirs constructed on them. While these have had the effect of reducing area available to the production of crops and game, they provide an abundance of fishing and other forms of water recreation.

Game indigenous to the area is as varied as the habitat. Deer and wild turkeys are the most common big game species, but occasionally an errant bear is reported. Among game and and furbearing mammals are rabbits, squirrels, foxes, raccoons, opossum, muskrats, mink, and wildcats. Game birds (besides turkeys) are quail, doves, waterfowl, woodcock, and Wilson's snipe.

Hal S. Atkinson, Jr., Graham, is the Central Game Lands Supervisor. He has many years of training and experience in wildlife management. Under his supervision are two mobile development crews. Earl W. Sanders, Yanceyville, heads up a crew stationed on the Caswell Game Lands. He is assisted by Robert Lee Neal, Reidsville, and Steve Harris, Blanch. James H. Odum, Pinebluff, heads a crew stationed at the Sandhills Game Lands and is assisted by Mark W. Dover, Aberdeen, and Steve Juhan, Rockingham. All crew members have special training in wildlife habitat development, and interest in their work is reflected in their energy and enthusiasm.

Altogether there are 153,626 acres under development in the Central Game Lands, with 1,226 miles of boundary lines, most of which have been marked. These consist of:

Name	*Acreage*	*Ownership*
Sandhills	57,250	State
Caswell	14,999	State
Butner	13,158	State
Uwharrie	46,493	U.S. Forest Service
Robbins	3,126	Catawba Paper Co.
Merry Oaks	3,111	Albemarle Paper Co.
Goshen	439	Albemarle Paper Co.
Smith Creek	1,303	Albemarle Paper Co.
Williamsboro	1,500	Albemarle Paper Co.
Lick Skillit	990	Albemarle Paper Co.
Louisburg	1,095	Albemarle Paper Co.
Embro	1,203	Albemarle Paper Co.
Oakville	1,838	Albemarle Paper Co.
Airlie	822	Albemarle Paper Co.
White Oak Swamp	3,299	Albemarle Paper Co.

In addition to these is the 3,000-acre Cowan's Ford Waterfowl Game Lands owned by Duke Power Company, where hunting is not presently permitted. This area holds a wintering waterfowl population of some 250 geese and several thousand ducks. Each year some 60-80 geese remain in the vicinity of the refuge in the summer months. For the past two years some 38 goslings have been raised through the use of nesting platforms.

ON Central Game Lands, as in the others, the prime objective is to develop public hunting lands to the greatest benefit of the game concerned and to the hunters. Some of the work, of course, involves maintenance of access roads, equipment used in habitat development, and permanent structures such as equipment sheds, workshops, stables, kennels, and storage sheds.

In actual habitat development, the practices are as varied as circumstances demand and the species to be benefited. A problem peculiar to the Sandhills Game Land is the persistent growth of scrub oak that produces little, if any, wildlife food. This can be controlled by machinery, but that practice is expensive and inefficient. A better and far more successful technique is controlled burning. This does not harm valuable longleaf pine timber. Further it controls scrub oak growth and stimulates growth

especially desirable for deer browse and small game food.

Tracts of woodlands are cleared and planted to wildlife foods on almost all of the areas. These are cultivated and maintained to produce a maximum amount of food and cover for both game birds and game mammals.

Another useful practice is the construction of water holes, referred to as cisterns in western states. These collect water during rainy seasons to provide drinking water for game.

A variety of wildlife foods are planted on selected tracts. These include shrub and sericea lespedeza, millet, cereal grains, reseeding soy beans, partridge peas, fescue-clover mix, and various types of millet. These provide food for big game, upland game, and waterfowl.

On the Sandhills Game Lands has been developed one of the nation's finest bird dog field trial courses. This requires considerable time, effort, and equipment on the part of habitat development crews, but activities carried on to develop and maintain the field trial courses benefit hunters and game as well as field trial enthusiasts.

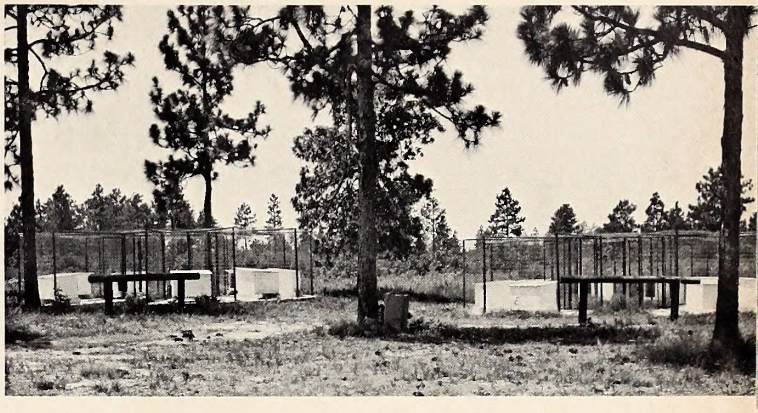
Kennels are maintained for bird dogs and foxhounds, and stables for horses used in connection with running field trials. These are new, modern, and among the best in the country.

Part of the Uwharrie Game Land, second largest in the Central Game Lands region, has been under cooperative agreement between the Wildlife Resources Commission and the U.S. Forest Service for a number of years. It consists of rather scattered tracts in Davidson, Montgomery, and Randolph counties, and offers a variety of hunting for deer and wild turkeys, plus rabbits, quail, raccoons, squirrels, and other upland game.

It lies near several metropolitan areas and is highly popular with hunters from Asheboro, Greensboro, Winston-Salem, and other nearby cities. In past years, most of the hunting on Uwharrie was confined to the largest tract, formerly known as the Uwharrie Wildlife Management Area. This consisted of only 11,000 acres of hunting land. This year, the entire 46,493 acres of Uwharrie National Forest are open to hunting.

To encourage a spread-out of hunting, especially for deer, the Forest Service and the Wildlife Commission have cooperated in surveying and posting boundary lines, establishing campsites, and developing habitat. Further, the Forest Service has acquired an additional 1,800 acres of land formerly posted to prohibit hunting. The boundaries of these tracts have been marked.

On the Game Lands leased by Albemarle Paper Company to the Commission a rather unusual wildlife management technique has been developed. Many of the areas are pine tree plantations that often amount to deserts as far as wildlife is concerned. These are now being developed for wildlife by thinning every third row of trees and planting wildlife food plants. ◆



These are some of the new kennel units maintained for bird dogs and fox hounds on the Sandhills Game Lands for use during the various field trials. These facilities are considered some of the best in the country.

This is a typical pine woodland with grass and brush understory found on the Uwharrie Game Land. Developing game management plans for this type of habitat is a challenge to the wildlife manager.

One of the basic tools of the wildlife manager on many of the Central Game Lands is controlled burning. It controls scrub oak and stimulates the growth of deer browse and small-game food plants.

THE FOXES

by Rod Amundson

More good than harm, say most game biologists of the red and gray foxes. They have never been abundant and probably never will be. Read about them.

IF someone says you are "crazy—like a fox," consider yourself complimented. Remember the tales of "The Fox and the Grapes," "The Fox and the Wolf," and other immortal parables by Aesop? These testify to the intelligence and cunning of the fox.

No other North Carolina animal is subject to more pro and con discussion than the fox. Fox hunters love the species. Quail and rabbit hunters are all-out for wholesale and complete extermination of foxes. Much of the invective directed against foxes is completely groundless. The fox cannot be compared with a saint, and at the same time should not be condemned as a criminal. His living habits place him somewhere between the two extremes, although he will often shift from one extreme to the other.

North Carolina is blessed—or cursed—with two species of foxes, depending on the individual attitude toward the breed. Most abundant is the gray fox, *Urocyon cineroargenteus,* (which, translated loosely from Greek, means "ashy-silver dog tail"). Less common is the red fox, *Vulpes fulva,* (Latin for "yellow fox"). Because of many similarities between the two animals, they will be discussed together and important differences pointed out.

History

Like many other animals, foxes play an important part in the literature of the world. Aesop composed his famous fables many years before the birth of Christ. Many legends have sprung up regarding the fox, some so persistently that it is difficult to separate them from actual fact. Perhaps the most interesting one is also the greatest tribute to the foxes' cunning. It has to do with the unique manner of getting rid of fleas. The fox takes a tuft of wool in his mouth and wades slowly out into a pond or stream, giving his parasitic lodgers time to make their way up toward the back and head to keep dry. As the fox slowly submerges, the fleas are forced forward to the tip of the nose, and finally crawl into the tuft of wool. When the fox is completely immersed the fleas are left stranded in the wool and the fox is rid of the infestation. The Encyclopedia Britannica gives considerable credence to this legend.

Civilization, to a limited degree, has benefitted the fox. Both the red and the gray prefer an open timber habitat, and the clearing of land for agriculture has created a suitable environment in this state. The value of fox furs was recognized by early settlers, and huge quantities were obtained from the Indians and shipped to Europe. The fur of the red fox is far superior to that of the gray in color and texture.

General Description

Other than to point out certain differences between red and gray foxes, a description of the species is not necessary. The gray is the smaller of the two animals, ranging from seven to eleven pounds; the red fox ranges from eight to fourteen pounds. Although the smaller of the two, the gray fox has longer legs, proportionately. Both have characteristically bushy tails, erect, pointed ears, and rather long, pointed muzzles. There are so many color variations among individuals that often an examination of the skull is necessary for accurate identification. Red foxes may produce color variants in the same litter, with normal, silver, and cross variations in the same brood. The furs of silver foxes, raised in captivity and once highly prized by fashionable women, are nothing more than a color variation of the red fox. The same is true of black and cross foxes. The brick-red of the underparts of gray foxes sometimes extends up over the back, giving an appearance very similar to the red species.

Breeding Habits

Both red and gray foxes are den animals, and the dens may be anything from hollow trees to crevices in rocks to burrows in the ground. Both species will use the dens of badgers and woodchucks when such dens are convenient. The gray, however, is the most consistent denner.

In these dens the young are born, from two to five per litter in the gray fox and from three to ten in the red. Only one litter per year is born, and birth usually takes place in April or May, although March litters are not uncommon in North Carolina.

At birth foxes are fully developed except that the eyes do not open for several days. Usually they remain within the dark interior of the den until their eyes have opened and they have gained sufficient growth and vigor to make their way out to the sunny slopes where the dens are usually located. Their first appearance into the world of sunshine is about six weeks after birth. At this time they are old enough to eat solid foods, and it becomes a duty and a task for both parents to bring home a variety of foods which are obtained on foraging expeditions about the countryside. There are definite and close family ties throughout the breeding season. Once a female fox has accepted a mate, the pair remain together until the final breaking-up of the family during the fall months.

Young foxes closely resemble puppies in general behavior. They are extremely playful and spend hours on sunny hillsides near the den, wrestling and playing together, executing miniature battles and playing tug-of-war with sticks and bones.

Food Habits

Although foxes are classified as carnivores (meat-eating) their food is obtained from a wide variety of sources. If their food were confined only to the acorns, berries, fruits, and other vegetative matter that is frequently included in their diet, foxes would not present the game management problem that their habits have created. The vast range of foods which appeal to the palate of the fox lets him in for considerable difficulty. In any discussion of the food habits of the fox, it should be remembered that they are like any other animal, human beings included: they are inherently lazy, and following the line of least resistance, will reap benefit from the livelihood that is most easily obtained. Here are some of the more important items in the fox diet, although not necessarily in the order of importance: mice, rabbits, moles, shrews, woodchucks, snakes, lizards, frogs, crayfish, birds (any kind the fox can catch), newborn lambs, poultry, small turtles, field corn, acorns, fruits, berries, and even roots and grasses.

This gray fox roams the winter woods in search of a meal. Most foxes are opportunists and at times will take anything they can get. When game birds or mammals are eaten, it is usually the weak ones.

The above list of foods, although incomplete, holds the key to why foxes can be considered valuable animals as well as pests. If foxes were to be suddenly and completely eliminated from the list of North Carolina's animals, the agriculture of the State would soon be in a state of complete collapse. As mentioned before, foxes take foods which are most readily obtainable. The most abundant of fox foods are rodents. Rodents are notorious destroyers of crops. If foxes did not keep rodent populations

ILLUSTRATION BY WALLACE HUGHES

The gray fox is a great mouser, displaying cat-like moves in capturing field mice. High rodent populations attract foxes and other predators.

in check it would be impossible to raise any kind of field crop with the possible exception of tobacco. It appears that a few quail and chickens taken by foxes now and then are a small price indeed to pay for the protection to crops given by the rodent-consuming habit of foxes.

Rabbits are an important item in the diet of foxes, but this fact is by no means sufficient to warrant the wholesale destruction of foxes by hunters who enjoy rabbit shooting as their favorite sport. Rabbits are extremely prolific, and game census surveys carried on scientifically by Wildlife Resources Commission personnel have shown that both rabbit and foxes are abundant in many identical localities. A shortage of foxes might easily cause an increase in rabbit populations to the damage point.

Thousands of dollars have been spent in many states, including North Carolina, on studies of fox food habits. Trained scientists have analyzed the contents of the stomachs of foxes taken throughout the United States during every month of the year. None of the analyses have indicated that game birds of any kind appear with dangerous frequency in the fox diet. Foxes do eat quail, when quail happen to be a convenient source of food. They also take ruffed grouse and undoubtedly kill an occasional wild turkey. It must be admitted, however, that foxes and quail and turkeys existed and got along quite well together in the country long before the New World was ever dreamed of, and Man's interference with the natural balance among wildlife species does not justify the willful extermination of any particular species regardless of how damaging one species might seem to be to another.

To refer again to the concept that foxes prefer foods which are readily obtainable, poultry raisers who have suffered nocturnal raids on their poultry houses find it difficult to give the fox a place among desirable wildlife species. When a fox discovers that an abundance of food is available by the simple means of snatching a hen from the poultry roost, the roost is likely to be visited with considerable frequency. In such cases it is necessary to destroy foxes in order to protect property. Fortunately, relatively few foxes acquire a taste for poultry or the knowledge that barnyard fowl are easily attainable. The destruction of these few foxes usually corrects the situation locally.

The management of a species which is subject to so much controversy among sportsmen and farmers resolves itself almost entirely to a problem of public relations. Somehow quail and rabbit hunters must be convinced that in ordinary circumstances the presence of an abundance of foxes does not mean that rabbits and quail are placed in danger of extinction. At the same time, fox hunters, who naturally are interested in maintaining a high fox population, must realize that an over-abundance of foxes might upset an already precarious natural balance among species whereby foxes might destroy their food supply and thus destroy themselves. Farmers will tolerate foxes only so long as they do not prey on poultry, and under the U. S. Constitution, have a right to destroy marauding foxes at any time and in any manner. But they should remember that a few erring individuals do not warrant condemnation of the entire species.

Biologists have learned that there is never any justification for the wholesale slaughter of any species, regardless of how undesirable the species may become in isolated instances. Slowly but surely sportsmen throughout the country have come to the conclusion that money spent for bounties and wholesale predator control is sheer waste.

Where fox populations (particularly the red fox) are not sufficient to supply the needs of fox hunters, protective measures become necessary, and importation should at least be tolerated. Where an overabundance of foxes occurs, control measures should be instituted—but never with complete annihilation as an objective.

The crux of fox management lies in determining the level at which fox populations should be maintained, and then getting diversified factions of public opinion to cooperate.

Hunting and Trapping

The sport of fox hunting is second only to falconry in antiquity, having been practiced in Europe for centuries. In general, North Carolina fox hunting has not reached the social pinnacle of pink coats and purebred Hunter mounts, but the number of fox hunting organizations and fox hunting sportsmen attests to the popularity of the sport in this State, particularly in the Piedmont and Mountain sections. There are varied manners and codes of ethics in North Carolina fox hunting, but for the most part the enjoyment of the sport comes

PHOTO BY REX SCHMIDT

Young red foxes surprised by the photographer aren't sure where to go next. They often display a curiosity that may be their own undoing.

from the fellowship of the hunters and the pride they take in the voice and stamina of their dogs. The foxes are sometimes killed by the dogs, but as often as not, the fox escapes to be put up and run another day, and a hunter who shoots a fox is in danger of permanent ostracism from his society.

Anyone who has participated in a fox hunt can well understand why fox hunters love their sport, and why fox hunters are interested in the perpetuation of the species even to the point of importing foxes to stock certain areas.

Fox hunts usually begin with the mutual consent of dog owners who meet at an appointed stand with the dogs and release the pack at one time. While the dogs are ranging about the woods and fields in search of a scent, the owners build a fire and sit down to await the rhapsodic symphony of music which begins when a fox is put to flight. Lulls in the music, when the fox has led the hounds out of earshot, are filled with tales of fabulous feats accomplished by the dogs of justly proud owners. The friendly campfire repartee is often interrupted by the belling of the hounds as the fox approaches the starting site. Most dog owners can, or at least claim they can, tell their own dogs by the sound of their voices, and as the pack and the prey pass out of earshot again, arguments are apt to arise as to whose dog or dogs are in the lead.

Sometimes the pack kills the fox and the tail is cherished as a trophy. But more often the fox gets away, and the remainder of the night is spent in an attempt to assemble together wandering dogs.

The red fox is considered by hunters to be far superior as a game animal to the gray. Gray foxes frequently take to trees, or are easily overtaken and killed by dogs, thus putting a quick end to the nocturnal opera of the chase. Red foxes, on the other hand, because of their cunning and stamina, may lead hounds in circles throughout the night, or far into the next county.

Quail and rabbit hunters have often become alarmed and irate because fox hunters in some parts of the state have imported red foxes to be released as a replacement to real or imaginary shortages of red foxes. It is extremely doubtful whether such importations can have an important effect on fox populations and the relation of foxes to other game. When it is considered that the total fox population of the state probably numbers in the hundreds of thousands, a few dozens of red foxes added by importation cannot have any significant influence.

Trapping of foxes is frowned upon by fox hunters for obvious reasons, although it may become necessary in situations where foxes prey on domestic poultry. Fox trapping is a highly specialized art, and only expert trappers secure more than insignificant results. The fox trapper must have a thorough knowledge of the living habits of foxes, plus a healthy respect for their keen senses and cunning intelligence.

Enemies

Foxes in North Carolina have few enemies other than men and dogs. Horned owls are capable of carrying off kits, and an occasional kit may be killed by wildcats. If the story about the fox and the tuft of wool is to be believed, foxes can take care of their external parasites such as fleas. Healthy foxes, like other healthy animals, are almost never subject to serious infestations of either external or internal parasites.

There are a number of cases on record of foxes being afflicted with tularemia, and there have been several serious outbreaks of rabies in North Carolina. Rabies are usually a rare affliction, but an outbreak of the disease in areas of high fox populations can be extremely dangerous to people and domestic animals.

As is the case with all other wildlife species, Nature uses disease as a means of controlling excessive fox populations. Peak populations of foxes are invariably attended by outbreaks of diseases. Man's efforts to control fox populations by deliberate attempts at extermination time and again have been proven to be a useless expenditure of energy and money. Without the meddlesome finger of Man, Nature will provide plenty of foxes for devotees of the sport of fox hunting, and at the same time prevent foxes from destroying other game populations. ◆

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NORTH CAROLINA WILDLIFE

RESOURCE-O-GRAM

A ROUNDUP OF THE LATEST WILDLIFE NEWS

Migratory Birds

December 1 marked the opening of the North Carolina goose season and it runs until January 19, 1974. The duck season is December 6 through January 19. Woodcock season extends from December 8 to February 9, 1974. These and other Federal migratory regulations are available in abstract form from "Duck Regulations," 325 N. Salisbury Street, Raleigh, N. C. 27611.

Free Wildlife Plantings

The Wildlife Resources Commission has free wildlife habitat plantings for distribution. Application forms for these are available from County SCS offices, County Extension offices, field biologists, wildlife protectors, or by writing Wildlife Plantings, Wildlife Commission, 325 N. Salisbury Street, Raleigh, N. C. 27611. Available are shrub lespedeza seedlings, annual and perennial mixtures, and a limited supply of several other types of planting materials.

New Fishing Regulations

New fishing regulations go into effect January 1, 1974 and include a 12-inch size limit on bass in piedmont and eastern North Carolina (10-inch minimum remains in effect in western North Carolina). Trout regulations will be about the same as last year, but should be read carefully for details. Copies of the 1974 Inland Fishing Regulations will soon be available from fishing license dealers. By the way, don't forget your new fishing license!

See A Violation?

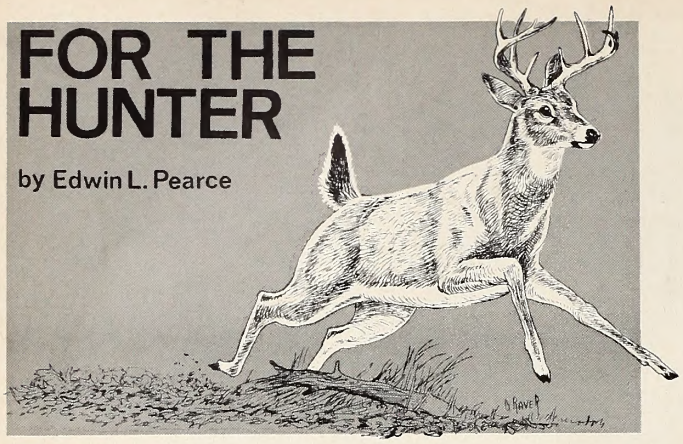
The game and fish law violator is stealing from you, and may be jeopardizing future crops of wildlife. If you see a violation of these laws or know of such, report it as soon as possible. A series of reporting telephone numbers is provided in the back of your Hunting Regulations.

Reward

October 17, Dr. John Burwell, Jr., 1026 Professional Village, Greensboro, N. C. 27401, lost a salt-water tackle box about a half mile north of Hatteras Inlet. There's a $50 reward for its return to Dr. Burwell.

FOR THE HUNTER

by Edwin L. Pearce



Conservation means the wise use of any resource. Many a deer goes to waste because the hunter doesn't know field dressing procedures. Don't you get caught.

THE expression on the face of the young hunter I encountered on a deer hunt in north Georgia haunts me to this day. While his eyes sparkled with triumph at having downed a beautiful six-point white-tail, his face mirrored puzzlement at what to do next. A glance showed me he had neither a hunting knife nor anything else needed to field-dress a deer. A few questions and I knew he hadn't the slightest idea of how to field-dress the deer or get it to his car.

Because I couldn't see that good meat wasted, I field-dressed his deer. As I finished, my hunting partner arrived. We cut a 10-foot branch from a nearby tree, swung the deer from it and the young hunter and my partner had it to his car before nightfall.

It's a sad fact that too many present-day hunters don't know how to field-dress a deer and I don't doubt such hunters have left dead animals in the woods because of that fact. All the hunter's preparations, knowledge of how to hunt and expenses go for naught unless he can do so.

The complete hunter is always prepared to properly care for the meat of the animal he bags and knows how to do so. He carries with him on his hunt written instructions on how to field-dress a deer and the equipment he needs—a sharp, thin-bladed but strong knife in a sheath attached to his belt, a pair of disposable, plastic gloves, about two feet of cheesecloth or muslin (I carry it folded in a rear pants pocket), a polyethylene bag for the heart and liver and a 20-foot nylon rope (threaded through belt loops and wrapped around the waist).

WHY is it necessary to field-dress your deer immediately or as soon as possible after the kill? It's to make sure that the good meat retains its goodness, that it doesn't spoil. The deer's natural body heat is the greatest cause of the "gamy" or "wild" taste so often complained about by venison eaters.

It follows naturally to do away with this body heat that the deer must be gutted immediately, the viscera removed, and the carcass propped open to provide air circulation.

Don't be in a hurry. The field-dressing is fairly simple and need not be messy. Put on your disposable plastic gloves and do it this way.

First, bleed the deer by inserting a sharp knife at the base of the neck and cut the great artery. Allow it to bleed freely. Avoid touching the musk glands inside the rear legs at the hock.

Before beginning the field-dressing, hang the deer by the head or place it on its back on sloping ground with the head at the highest point. To hang the deer, locate the tendon on the rear leg extending from the knee to the ankle and slit the hide between the tendon and the bone on both rear legs. Place a "spreader" stick through both these slits and hang the deer by placing this stick over a tree limb. Or loop your rope around the horns, throw it over a limb and pull and tie it so that the deer hangs free or barely touches the ground.

Make a shallow cut through the hide and belly muscles, beginning at the crotch and continuing upward to the breast-bone. Be sure it's a shallow cut and doesn't puncture any of the internal organs.

Next, reach in and locate the juncture of the windpipe with the paunch. Encircle the windpipe with the hand and slide it as far forward as possible, pull gently and sever the windpipe. Hold the severed end tightly and pull the paunch and entrails from the body cavity except where attached to the pelvis. Cut the diaphragm free of the rib cage and snip the tissues along the backbone to facilitate this removal. Tie the windpipe to prevent spillage.

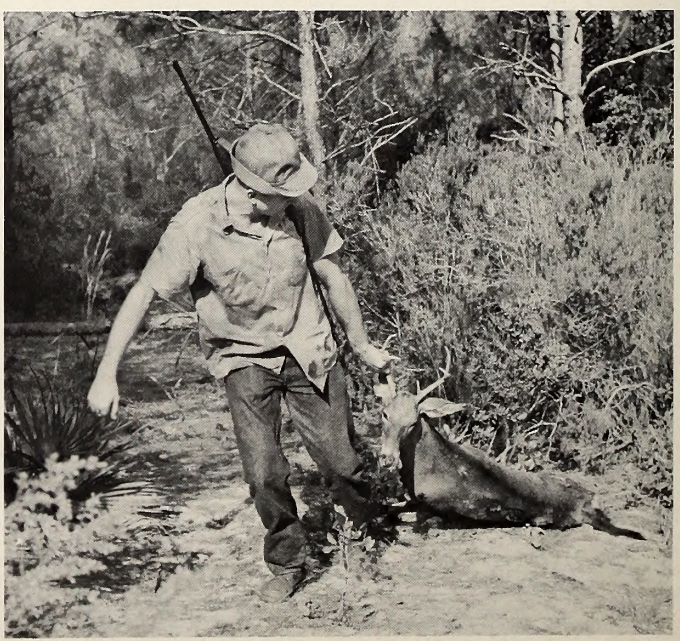


PHOTO BY FLORIDA NEWS BUREAU

Many deer hunters really don't know what to do next from this point on. Unless you know how to take care of your kill, you're not a complete hunter by any means.

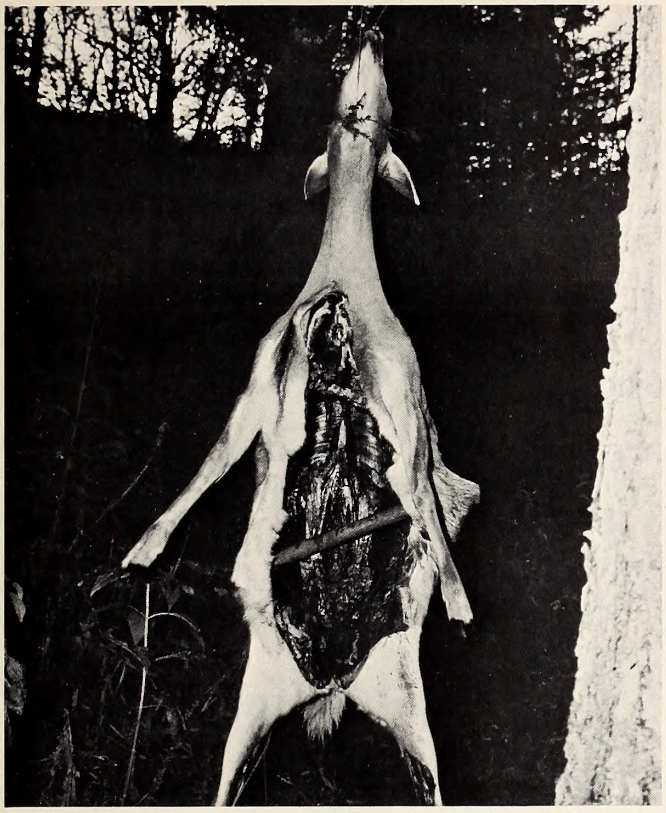


PHOTO BY JOEL ARRINGTON

The body cavity is wiped out (do not use water) and allowed to dry. Pointed sticks hold the cavity open to the air as shown. Depending upon the weather, flies and other insects may be a problem.

Free the penis where it emerges from the H-bone, turn it away from the carcass and carefully squeeze out all the urine to prevent contamination of the meat. Cut through the hide around the anus and penis, pull on the rest of the intestines and completely remove them from the body cavity.

Carefully sever the heart and liver. Puncture the diaphragm to permit better drainage of the chest cavity.

To help blood drain from the hams, spread the legs apart and locate the large veins on the inside of each leg about five inches below the crotch toward the feet and completely sever both.

Wipe out (do not use water) the inside of the deer with grass, leaves, paper towels, cheesecloth or muslin. Get it as clean as possible.

Insert at least two sticks of the proper length, sharpened at the ends, in the walls of the body cavity to spread it open and allow air to circulate.

Bury the viscera, bloody gloves and muslin and keep flies from the carcass.

To carry the dressed deer to your camp or car, cut a heavy pole or tree limb two to three inches in diameter about ten feet long. Place the small end first through the slits previously made between the tendon and the bone on the back legs and continue through the similar slits on the front legs, placing the head between the front legs. Center the deer on the pole with normal spacing between the front and rear legs—and it's ready to carry. Or cross the legs and tie them to the pole with your nylon rope.

Re-hang the deer at camp at least 12 feet high (flies and insects usually stay below this level). Split the pelvic bone if you have an axe, cover with cheesecloth or other netting and don't salt the hung deer.

If in a car, place in trunk with lid open to allow air to circulate. Don't ride it on the hood because of the engine heat.

Venison is a delicacy. Rarely do you have access to it except as a result of your own efforts. The first step to a delicious venison dinner is the proper field-dressing of the deer. If you dress it out immediately, if you do it correctly, if you let it cool and, within a short time, get it into the hands of a competent butcher, you'll have good, tasty venison.

Unless you've had experience in butchering, I don't advise your trying it on a deer. Take it to a licensed butcher, with whom you've made previous arrangements. Instruct him to cut off all fat (which easily becomes rancid), save all trimmings, cube the meat from the spareribs, flank, shank and shoulders, size the roasts to three or four pounds, cut the steaks about three-fourths of an inch thick and mark and double-wrap each item for the freezer. Roasts should be packaged individually, steaks according to the number in your family.

Prepared this way, you can easily share your venison with your friends and retain your share for your own freezer (including the heart and liver for the shooter).

By field-dressing your deer, you're well on the way to becoming the "compleat" hunter and extracting maximum satisfaction and enjoyment from your sport. ⬍

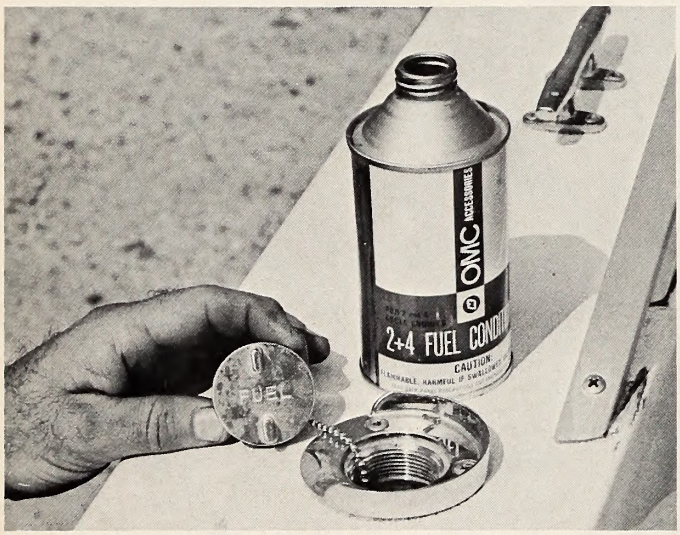
"I can remember when you enjoyed hunting, Dear."

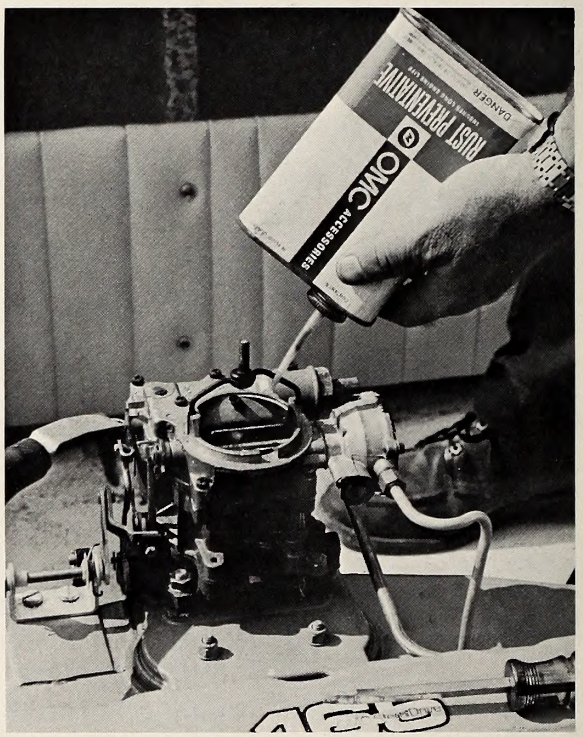
Stem to Stern

BY ED JENKINS

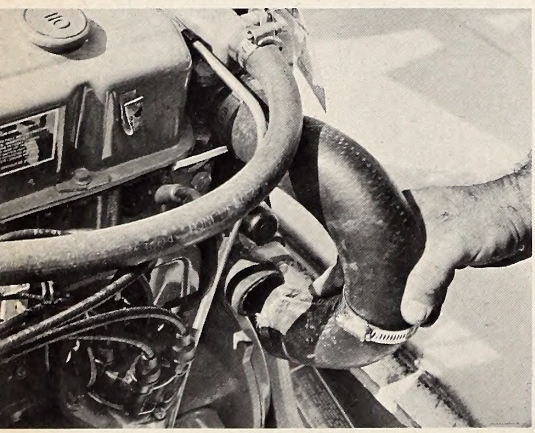
Winterizing Your Outboard or Inboard

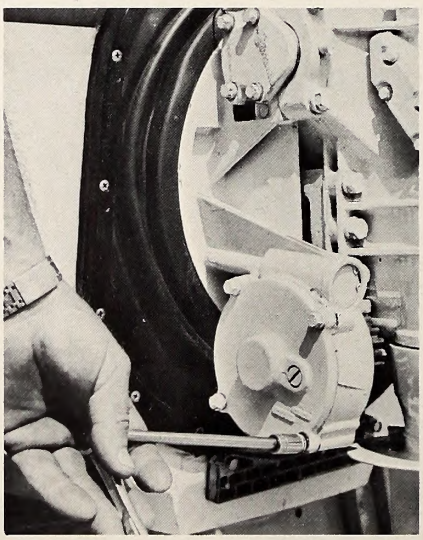
Save yourself some problems next spring by winterizing your outboard or inboard now. If you need major repairs, get some professional help.

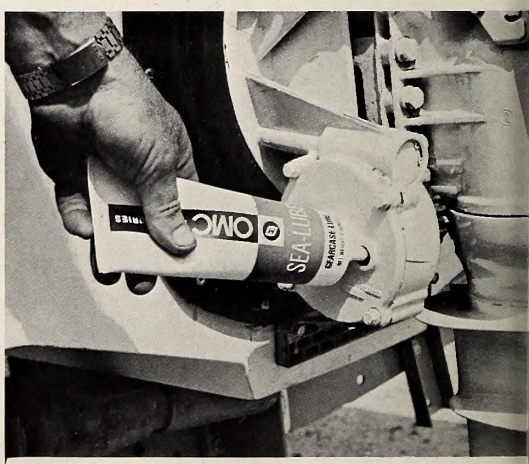


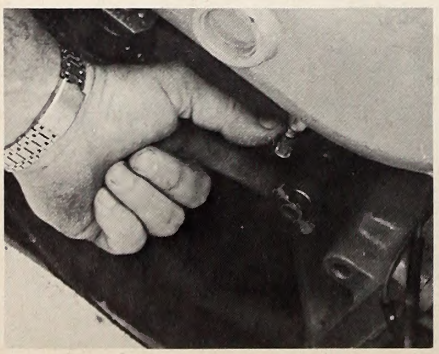


Put fuel conditioner in tank (above) then bring engine to operating temperature and change oil and filter. With engine running (right), squirt a can of rust preventive in the carburetor until the engine knocks off.

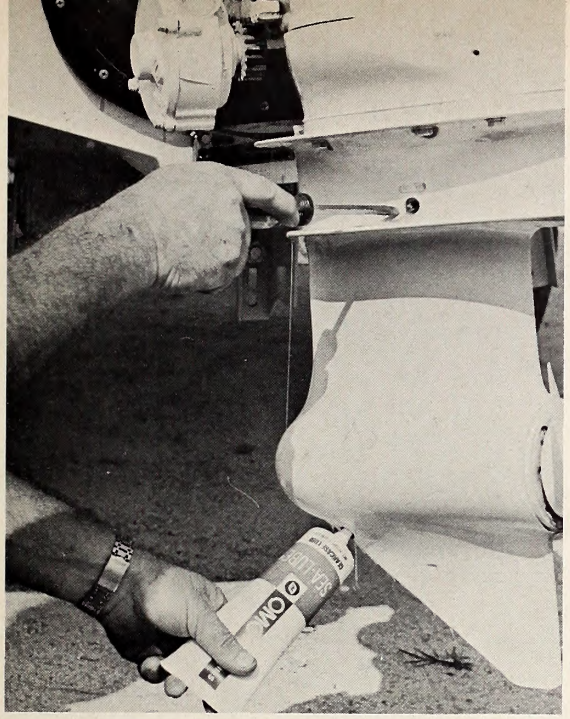


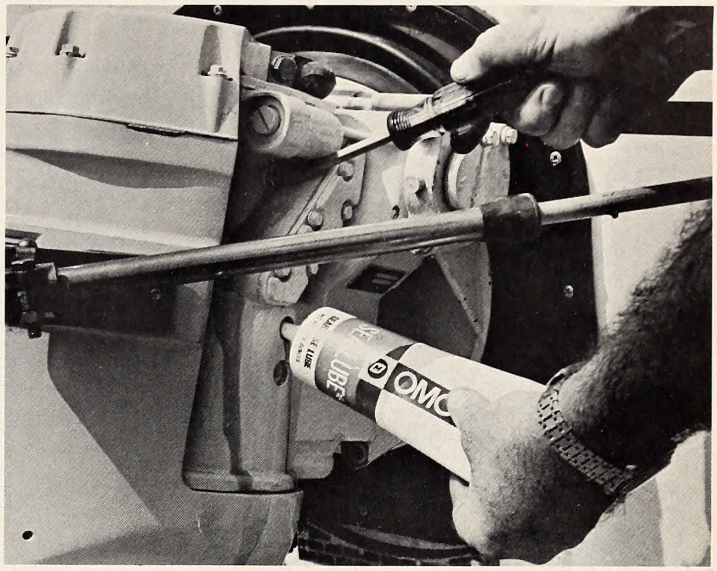




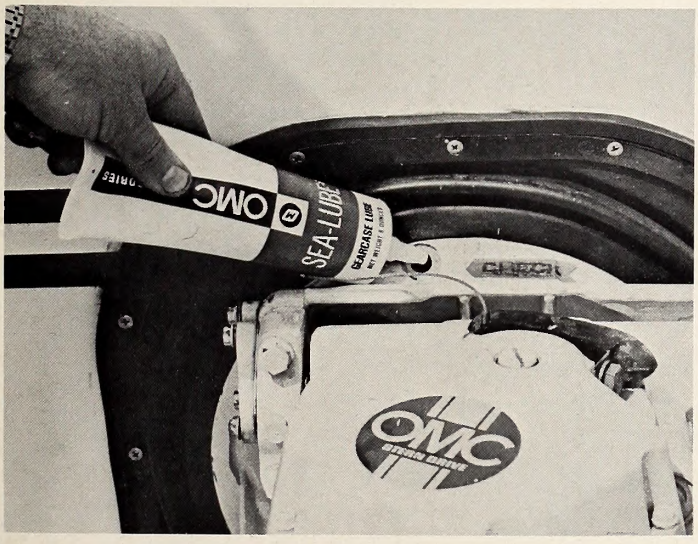


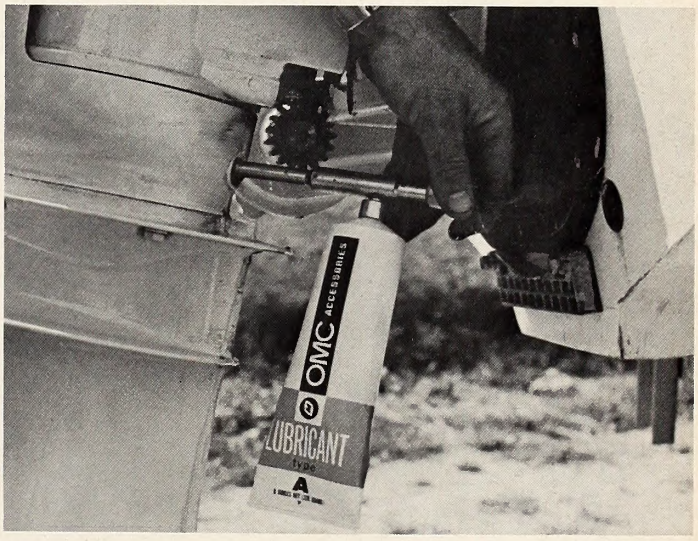
Drain water from engine and water pump (upper left and left). Antifreeze may be placed in engine to prevent rust. Drain power-tilt (above) and fill with a gear-case lubricant (above right).





Drain upper and lower housing units (above left) and fill with gearcase lubricant until excess overflows from vent. Use quality lubricants.

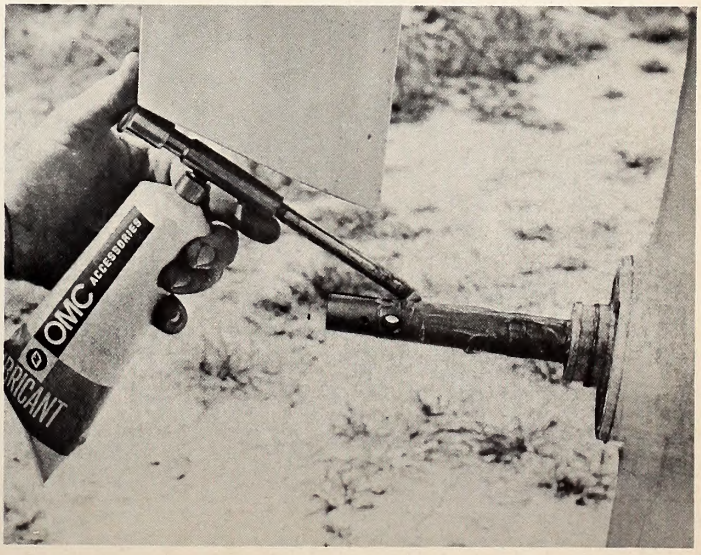




Check the intermediate housing and fill with gearcase lubricant if necessary (above).

All zerk fittings should be lubricated with a special marine grease (above right).

Remove propeller and use a marine grease to lubricate the propeller shaft (right). This step is important if your outdrive has a splined propeller shaft.



PHOTOS BY LUTHER PARTIN. EQUIPMENT COURTESY WYNN'S CAMPTOWN MARINA, RALEIGH.

Potential Killer

HYPOTHERMIA

by Ed Jenkins

WHAT would you guess to be the number one killer of people involved in outdoor recreational activities—(a) drowning (b) injuries due to fall (c) heart attacks (d) boating or hunting accidents? No, none of these. The greatest killer of outdoor recreationists is a little heard of menace called HYPOTHERMIA. Terms that we are more familiar with are "exposure" and "exhaustion;" however, the word hypothermia describes the rapidly deteriorating mental and physical condition that coincides with a drop in body temperature.

It has been found that cold kills in two distinct steps. Step one is exposure and exhaustion. The instant the body begins to lose heat faster than it produces it, the body is undergoing exposure. If exposure continues until the energy reserves are exhausted, the body will slip into step two: hypothermia. Two things now will happen: cold will reach the brain and deprive the individual of judgement and reasoning power. This will not be realized by the individual but is clear to others, and control of the hands will be lost. Without treatment, internal temperature will continue to drop and lead to stupor, collapse, and death.[1]

Prevention, of course, is the key word here. We are not saying don't go out on cold days, but we are saying understand cold and what it does to the body. Most hypothermia cases develop in air temperatures between 30 and 50 degrees, and wind and wetness play a major role in almost every case. Wet clothes lose about 90 percent of their insulating value, and when coupled with even a slight breeze, there is a rapid loss of body heat.

So, on cold days, try to stay dry and keep out of the wind. Never ignore persistent or violent shivering; your body is warning you it is in trouble. Don't try to keep going when you are wet and cold. Have enough courage to give up the hunt or reel in your line and seek shelter while you still have plenty of energy. Remember, exposure greatly reduces your normal endurance. Should exhaustion force you to stop, your rate of body heat production instantly drops by 50 percent or more, and you may slip into hypothermia in a matter of minutes.

If you or your group is exposed to cold, wet, and wind, watch for the symptoms of hypothermia. These symptoms usually occur in the following sequence: abnormal behavior, slowness of movement, slurring of speech, stumbling, weakness and repeated falling, delirium and finally collapse.

Should someone in your group exhibit one of the symptoms, treatment should begin as soon as possible. Get the victim out of the wind and rain. Further exertion such as forcing the patient to go on walking may be dangerous and should be avoided. Remove all wet clothing and get the victim into warm, dry clothing. Hot drinks and food are valuable in the treatment. If the victim is semiconscious or worse, he should be stripped of all wet clothing and placed in a well-insulated, dry sleeping bag, preferably with a suitable companion alongside to provide warmth. Warm sweet drinks should be taken liberally. No alcohol should be given as this increases loss of body heat and lowering of blood pressure?[2]

Hypothermia is *real,* and it is *deadly,* but it is also *preventable.* Take your rain gear with you on your outings and put it on before you get wet. Don't forget that dry change of clothing, thermos of coffee, and something to nibble on. Keep an eye out for the members of your group. You know what hypothermia is—they might not. ◆

Winter hunting and fishing obviously take the sportsman on or very near cold water. Be extra careful about getting wet and then staying that way for more than a few minutes.

1 Four Lines of Defense Against Hypothermia, SAFECO Insurance Company of America

2 Strang, P.J.H., New Zealand Medical Journal, Jan. 1969

Only A Hawk

by Q. J. Stephenson

• It's a well-worn idea that we are increasingly losing our touch with the natural world. That we are being drilled, dredged, dammed, stripped, cut down and even "drugged" away from it by the oily ministrations of the Coke-Pepsi-Exxon-Disneyland-General Motors-ITT idea of what "living" should be. That the natural world is the basis for the strength of our existence, both physically, psychically and morally, is a truly alien thought in the minds of most people.

But once in a while we meet personally or via the media men who are still close to the earth; a logger, a commercial fisherman, or maybe even a wildlife biologist whose job is to ensure there is enough game for hunting. And always there is a faint shock of surprise when we learn that these men who take from nature, who harvest its wealth with apparent indifference, actually are imbued with a great respect and love for the natural world. Its life is their life. Such a man is Q. J. Stephenson, a dragline operator from Garysburg. For 45 years he has trapped the Roanoke River bottomlands in his native Northampton County for otter, muskrat, mink, fox, beaver and raccoon. He is expert at this ancient harvest but more than that, his years spent in the swamps are engrained with deep feelings for the natural world. The simple eloquence of his experience, recounted here, is a moving affirmation of that. **Ted Dossett**

A few years back I was running a trapline on a far back section of the Roanoke River. Mine was a very lonely trail as I tended my traps set for mink, muskrat and otter. In this back section I had peace and solitude—something lacking in so many people's lives today.

One cold morning I noticed a large hawk sitting on a log near my trail. He did not attempt to move a foot or more when I approached him. I always carry muskrat meat in my pack for baiting mink traps. Before I left, I placed half a muskrat near Mister Hawk.

The next day on approaching the log again, there was the hawk, bolder than ever. He enjoyed the meal of muskrat, eating it before me, something he would not do the day before.

For three weeks I fed this hawk. After a week he would take the meat from my hands. I began to look forward to seeing and feeding my friend. Surely by now, if ever a friendship had formed between man and hawk, this was it. Two weeks later we had a bad ice and snow storm. On approaching the log the very cold morning after the storm, there lay the hawk, dead below the brush near my trail. I have never had a more lonely moment in my life; did I cry? Yes! In that far back section on the Roanoke River a friendship had formed between myself and one of God's wild creatures. I will never forget.

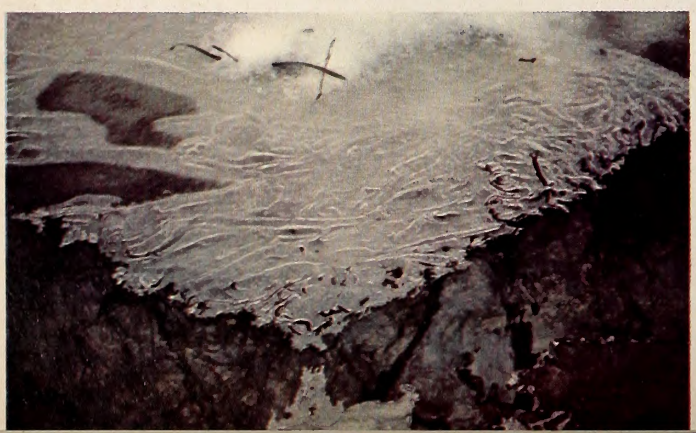
Upon examining this hawk I found it had been shot sometime in the past.

Bird shot was imbedded in its breast.

Winter Woods

Places of solitude are becoming difficult to find in our busy, noisy world. A winter woods may offer a tiny respite from the hectic life that most of us endure.

Photo Feature by Ted Dossett



IT'S A DOG'S LIFE...

In the Brier Patch

by
Joseph N. Vaughan
Murfreesboro

THE day was bright, the briers were thick, and the dogs were eager. My hunting companion, Nick Parker, released six handsome beagles from a make-shift dog box, and instantly, the dogs started hunting a countryside panorama ranging from open farmland to dense, thorn-infected woodland. Dressed in brier-torn boots and a colorful array of thread-bare clothes, we could have passed for hobos, except for the shell-filled hunting vest on our backs and the well-oiled shotguns in our hands. This was a day of northeastern North Carolina rabbit hunting and we were just about as excited as the dogs.

The scene for this oddly dressed hunting duo is Hertford County, and the rabbit hunting is fine if one has the frontier spirit to brave the clothes-tearing thickets of briers which serve as home for many of the four-legged hoppers. But before searching for frontier spirit, be sure to secure the company of several hard-to-raise, hard-to-manage, and hard-to-beat hunting dogs called the beagle.

From birth onward, the beagle proves to be a timid, but good-natured dog which can be turned into a pet as easily as trained to become a sporting dog; but for whatever purpose the beagle is to serve, the young pup demands a great deal of attention. The normal litter of a beagle is about six- to eight-pups, but usually one or two of the pups will not reach maturity. Hook and ground worm parasites can force the average beagle raiser to buy bottle after bottle of worm pills and make almost daily trips to the veterinarian in order to save the lives of young beagles. Wayne Parker, Nick's brother and owner of the beagles mentioned at the beginning of this article, has run the route of raising healthy pup-

PHOTO BY JACK DERMID

pies, and he says his hard work has paid off.

"I was able to sell several pups last fall at a profit which just about equaled the amount of money I have spent to raise the puppies," Wayne said.

The hardest aspect of training a beagle to hunt rabbits is finding the time to take him to the woods. The beagle is a natural born hunter and needs little more training than being broken to voice command and experience to become a fine rabbit dog. Of course, every dog has his own style of hunting as well as individual weaknesses and strengths.

"Some beagles only jump a rabbit and then let the rest of the pack carry on the chase, some dogs hunt best while hunting with other dogs, and about one dog in a thousand will do everything well," Wayne said.

The first step in developing a beagle's ability is to start taking him to see the experienced pack in action. Beagles as young as four months old have instantly joined the pack on their first trip out; but then, some of the best dogs I have ever seen would sit hunting trip after hunting trip by their master's side and not join the pack until they were almost a year old.

A beagle owner feels a deep sense of satisfaction when he can take his hounds hunting and be able to predict what his dogs are going to do. Just about all of the beagle's behavior can be understood by the observant hunter. A knowledge of the countryside and such common things as the way a beagle barks or even wags his tail can reveal to the hunter what his next move should be. With this understanding of the beagle, one is about half-way prepared to meet the unexpected conditions of a northeastern North Carolina rabbit hunt.

"One thing about rabbit hunting, you usually have a chance to hunt everything before the day is over," Wayne said.

In this region there are three varieties of rabbits and each variety demands a special kind of hunting tactic by both man and dog. The best known type of rabbit, the cottontail, is so abundant that the animal is frequently seen dining in a farmer's garden, or visiting the barnyard after dark. The cottontail is a highland rabbit which loves to run a pack of dogs ragged in such areas as cotton fields, high brush, and thin woodland. This rabbit is a very fast runner and counts on its great speed to evade a pack of beagles. The cottontail will generally run in a circular pattern from the point-of-jump and a large pack of dogs will hardly ever lose the rabbit's scent. Though the cottontail offers a clear target, many hunters jokingly claim the rabbit can outrun the speed of shotgun pellets.

The swamp or marsh rabbit is almost if not more common than the cottontail, but being a shy rabbit, it will seldom venture far away from the small woodland stream or marsh home. The marsh rabbit is a slow runner, but its ability to confuse a pack of dogs is amazing. In hunting the marsh rabbit, the beagle must use his instinct as well as his nose, and the hunter must keep alert or the rabbit can quietly pass within a few feet of him and never be noticed because of thick underbrush. As a rule, the marsh rabbit will run a straight line along the bank of a stream, frequently hopping from one bank to the other in an attempt to lose the dogs.

A third form of the cottontail is called the blue-tail among other not so pleasing terms with which hunters identify this frustrating varmint. Unfortunately for the hunter, the blue-tail inherits the great speed of the cottontail and the cunning of the marsh rabbit.

"A blue-tail has one purpose in mind, and that is to run just as far away as he can," Wayne said.

Because of the beagle's strong sense of smell, it is not uncommon for a beagle to run a multitude of other animals beside the rabbit. Almost as many hunters are using beagles to hunt deer now as they are for rabbits because the beagles can run in areas too dense for the larger deer hound. But for those hunters who continue to employ beagles for the purpose of rabbit hunting, deer can pose quite a problem especially if a hunter has killed a deer before his rabbit dogs.

"I could break them off in about fifteen minutes before I killed that deer, and now it takes about two hours," Wayne said, referring to one occasion when he killed a deer while rabbit hunting.

A two-hour deer chase can rob the short-legged beagle of his strength; but still, Wayne is lucky, for most beagles make an overnight stay when they go chasing deer.

I have seen beagles tree squirrels, go wild over a covey of quail, and tease an ill-natured opposum into a quarrel which forced me to become an unwilling referee. More than one cat has had the double misfortune of having the coloration of a rabbit and a pack of beagles at its heels and thus met the sights of a hunter's gun.

"My dogs once jumped a cat in a dense woods and a hunting companion accidentally mistook it for a rabbit. The cat must have had a funny smell to him because the dogs ran the cat in the woods, in the cotton patch, in another woods, and if the guy hadn't shot the thing it would have kept right on going," Wayne said.

With a knowledge of a few basic ground rules, anyone can enjoy a day of romping across open fields and through the woods with a pack of beagles. Some people enjoy seeing their hounds run and try to outmaneuver a rabbit so much that they often leave their guns at home. But for those individuals who enjoy a good rabbit stew, a 12-gauge shotgun is usually preferred, though there are many hunters who consider a smaller gauge to be more effective, and size #6 through #8 shot are generally accepted to be the best shell load.

• **continued on page 27**

THE MOST LOGICAL FROG ©

by

JANE & DERRY WALKER

HI, BOYS AND GIRLS:

THE COTTONTAIL RABBIT MULTIPLIES AT THE RATE OF SEVERAL LITTERS PER YEAR. THIS MEANS THAT MAMA COTTONTAIL MAY HAVE ABOUT SIXTEEN BABY COTTONTAILS EACH YEAR. EACH COTTONTAIL THAT SURVIVES WEIGHS 2 TO 3 POUNDS WHEN GROWN, AND GROWS TO A LENGTH OF ABOUT 13 INCHES. THE COTTONTAIL IS A VEGETARIAN. WHAT IS A VEGETARIAN? CAN A VEGETARIAN HARM A GARDEN?

L.F.

The Predator

by W. B. Chason
Wildlife Patrolman

THE meeting lasted longer than Jake thought it would and it was 11:20 p.m. when he finally crossed the last bridge leaving Wilmington and headed south on NC 133 at a speed greater than the posted limit.

As the powerful sedan roared toward its destination of Southport 25 miles away, Jake thought of the business meeting and banquet he had just left, wondering if the speech he had given was as boring as the ones to which he had listened.

Anyway, he thought, the meal was really good, which was unusual, for it seemed most of these events were not only boring but the food half-cooked and served by hurrying-to-get-out waitresses.

He flicked on the dome light and glanced at his watch: 11:40 p.m. He thought of the busy day and of having to be in Charlotte at 9 o'clock for an all-important sale which just might result in a nice commission.

"Will I ever make it?" he said half aloud and pressed the accelerator pedal hard. The big sedan picked up speed and flashed through the night, its high beams illuminating the road ahead.

Far, far ahead a doe deer stepped gingerly out of the brushy bay thicket and slowly made her way to the highway. She stood for a long moment on the shoulder of the road listening. The only sound that came to her flicking ears was the steady hum of bay mosquitoes that would plague her the rest of the night. She knew her greatest danger came from a large bobcat that roamed the pine ridges looking for a meal. The fading claw marks on her flanks attested to the fact that the cat was quick and only her instincts and the cat's inability to run great distances had saved her the year before. Her inborn instincts, even greater after the altercation with the cat, would see her safely through the night. So she slowly lowered her head and began grazing on the young, tender grasses that grew on the road shoulder.

Instinct could not tell her that tonight the predator would approach from the north, on four wheels, and at a high rate of speed.

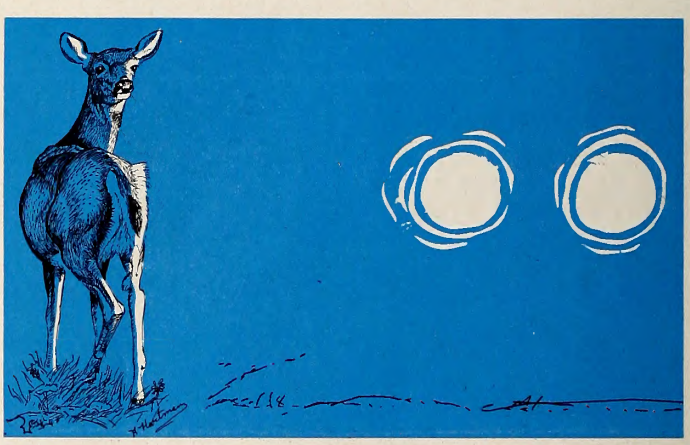
The dinner was beginning to have its effect on Jake. His eyes grew heavy with sleep and the gentle, rocking motion of the car as it sped through the night lulled him into a semi-conscious state; half-awake, half-sleeping.

The yellow diamond-shaped sign "Deer Crossing" flashed by on Jake's right in glare of the car lights.

The doe paused in her grazing and lifted her head high. She heard the hum of the car as it approached from the north. She had heard this noise many times before and always this strange, high-powered machine would roar by, never attempting to chase her.

She stood with head high, listening as the noise grew in intensity and after awhile, she slowly lowered her head to the grass again.

Jake stifled a yawn with the back of his hand and rubbed both eyes in an attempt to drive the sleep from them. He carefully opened the wing vent on his side and reached into his shirt pocket for a cigarette. The orange-red flare of the match glowed dimly in the interior of the car as it streaked through the night. As Jake carefully brought the match up to the cigarette hanging limply from his lips, the car's far-reaching headlights picked up the split second glint of the deer's eyes as she changed position on the shoulder ahead.



This second warning of trouble ahead went unseen by Jake, who now squirmed deeper into the seat, taking a long drag on the cigarette and exhaling the smoke towards the open wing vent.

The doe grazed while the roar of the approaching car grew louder and louder. The sudden flash of approaching lights made her lift her head. The glare of the lights grew steadily brighter and now the deer's instinct told her to flee to safety, for this was indeed danger approaching. The light grew brighter until the deer was enveloped in a shroud of glaring white light. This glaring, roaring machine unnerved her, her only thought—to get out of its way. She bolted from the shoulder of the road, directly into the path of the onrushing automobile.

Jake frantically jerked his foot from the accelerator and hit the brakes. The sound of screaming tires filled the night air, but the sound of metal striking flesh was even louder!

The automobile, invented by man to convey him and his belongings from place to place quicker and in greater comfort than could the mule or horse,

can also claim the distinction of having killed more people than the casualties suffered during World War II.

As one drives the highways of our state, seeing carcasses of various wildlife species lying on the roadway, we can only wonder at the staggering amount of wildlife this "predator on wheels" has claimed during the short time it has been on the American scene.

The bobcat and other predators kill for one reason —survival. Their very livelihood depends on their ability to kill swiftly and surely. When this ability fails, their lives are very short indeed, for without food strength slowly wanes and death by starvation is the end result.

To say that all accidents involving wildlife could be prevented would be absurd. Various wildlife species will continue to dart under, into, and in front of moving vehicles. These accidents are unavoidable and understandably so.

On the other hand, some people race by the "Deer Crossing" sign, travel a distance down the road and collide with and kill a deer—possibly a passenger or the driver, too. The sign warned him what to expect, yet apparently he either ignored it or didn't see it at all.

This same person would have been in for a monumental surprise if the sign had read "Bridge Out Ahead."

This type of accident can and should be prevented.

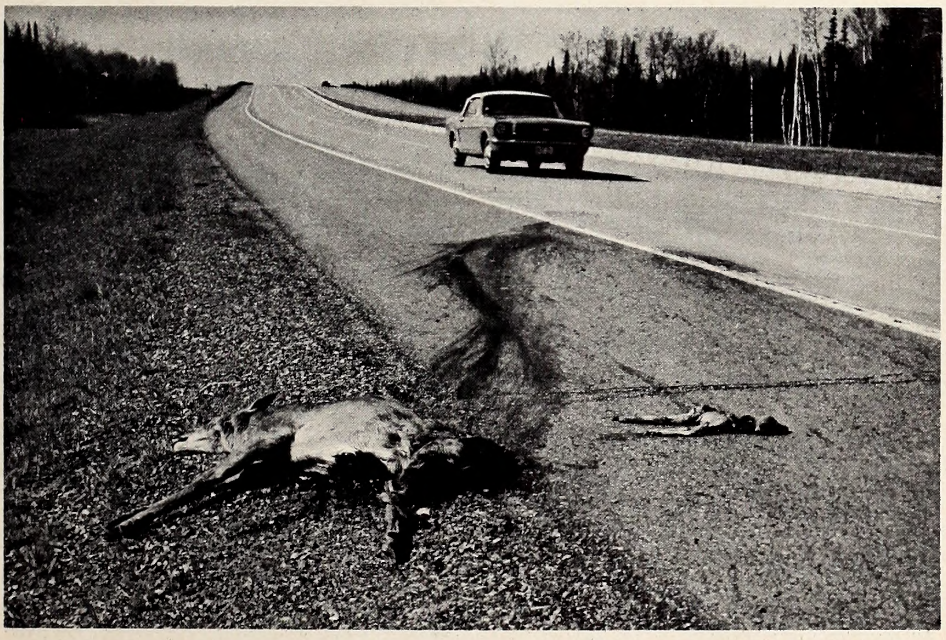
Deer and other species of wildlife are killed at various times during a 24-hour period, but the majority of wild animals are struck down during the period between sunset and sunrise.

When driving at night, and especially when passing through posted deer areas, we should become sharply observant and concentrate on the shoulders of the highway. This is where the animals will be crossing as they search for their survival.

The glint on the shoulder of the road ahead could be a beer can, but then it could also be a deer, raccoon, bear or other nocturnal prowler.

Don't take chances! Slow down and be sure!

The sleek, shiny, high-powered tribute to man's fast rise in technology sits docilely in our driveways and parking lots. Tonight, when it roars to life, will its prey be human or animal? Or maybe both?



The loss of game on our highways is an ever-increasing problem. You can help our wildlife and save yourself a possible serious accident by taking it easy, particularly at night. The doe killed here would have soon borne the fawn.

PHOTO COURTESY MINNESOTA
DEPT. OF NATURAL RESOURCES

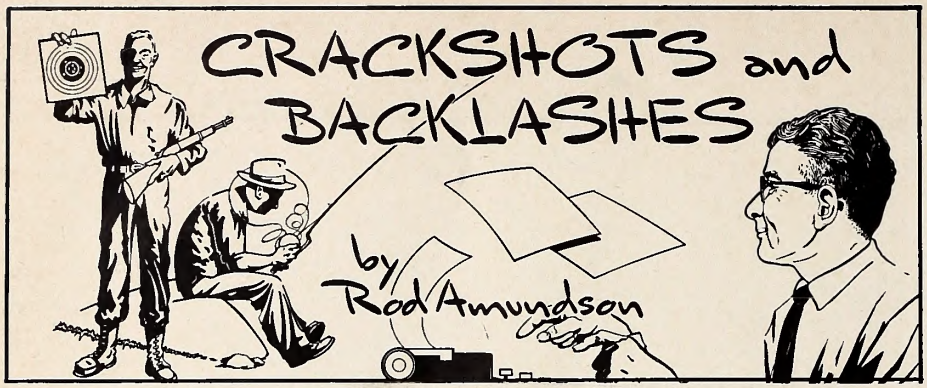
• **MALLARDS continued from page 5**

of war," but mother knows how to end this by eating the insect herself.

The mallard is a dabbling duck, feeding in shallow water, and often tipping up to an amusing vertical position as it stirs up the bottom ooze and strains out crustaceans, mollusks, algae, and the seeds of aquatic plants. The adult usually weighs from two to three pounds and has a diet of about 90 percent vegetable and 10 percent animal matter. The duckling's diet is just the opposite of this because of the need of protein to grow normally.

One occurrence that I observed of my ducks was that of a young duck and a bantam hen that I had. One year, in early March, I found an egg that had been dropped on the lake's bank by one of the adults. So, I took the egg and placed it under a broody bantam hen. In about a month or two after hatching, I took the young duck away from the hen and put it with the other adult mallards. After many weeks had passed, this young duck came upon its mother, waddled as fast as it could to her, and bit her bill. I have often wondered what it meant by doing that.

Mallards seem to be very smart as proven to me by this one and many others, so, if you look at them close enough and long enough, you just might learn something toward your benefit! They will give you, as they have given me, much pleasure for many years to come.



It has little or nothing to do with the production of more fish or game and it won't help make hunting or fishing better, but a few comments about why you get this magazine (or why you don't) may help answer a question or two. First of all, unless your subscription has expired and you've failed to renew it, a magazine with your name and address on it leaves the Raleigh Post Office sometime around the 25th of each month. If you don't receive your copy of WILDLIFE in a reasonable length of time, please let us know and include all details that you know . . . current address, whether you've moved recently, and a copy of the mailing sticker on the last magazine received, or *the numbers on the sticker.*

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Endangered Species?

Dear Sir:

Since my name was mentioned twice in Darrell Louder's recent letter (September 1973 Wildlife), I would like to reply to his denuciation of the endangered fish list. Incredibly, he begins with the statement about unethically misleading sportsmen and then proceeds to do just that, not once but twice, in the very same letter! For example, he mentions that he cannot accept the creek chub, *Semotilus atromaculatus,* as being endangered, but in fact, this particular species does NOT appear on the list! The list includes Semotilus sp., an undescribed chub in the Lumber system. The common name, "creek chub," was given to *Semotilus* sp. for lack of a better one and in an effort to help the non-professional reader. *Semotilus* sp. is a creek chub, but a more definitive common name awaits description of the species. Thus, the common name, "creek chub," is a little confusing; "*a* creek chub" would have been better, but this does not change the fact that the species Mr. Louder attacks is not even on the list in the first place.

Mr. Louder also states that he does not believe that the Waccamaw endemics are endangered by the spraying of silvex in canals around the lake. The heading for that column very clearly states, "Projects Affecting." There is no mention whatsoever of their endangering the fauna. Nobody, except Mr. Louder, has ever referred to this as endangering the species in the lake. He states that his comments are based on fact not hearsay and then proceeds to make two factual errors which should have been avoided.

The really disturbing aspect to Mr. Louder's letter is the misimpression that it will create in the minds of some readers. Mr. Louder asserts himself as the real authority simply because he originally surveyed the Lumber and published a paper on the Waccamaw silverside. Comments like "whoever prepared the list got carried away," "my comments are based on fact not hearsay," and the whole paragraph about yelling "wolf" are a disservice to the concept of endangered species. He creates the impression that the process was haphazard and arbitrary, but this is totally wrong. The endangered species committee met several times in 1972 and early 1973. The first meetings were devoted to how to approach the problem of endangered species in North Carolina and how to define the categories of status. Lists of the various groups of animals and plants were then compiled by the individual members and discussed by the committee as a whole. Those appearing in *Wildlife* have been revised several times. The fish list in particular was compiled by two icthyologists in the state and was reviewed by specialists in Virginia and Florida who have worked extensively on the North Carolina fauna. To be sure, these four biologists have surveyed and sampled many miles of North Carolina rivers.

As part of the discussion at one of the meetings, the question about the status of the Waccamaw endemics arose. The committee unanimously agreed that a species whose entire range on this planet is so severely restricted is one whose prospects for survival are in immediate jeopardy and hence endangered. I believe this is also the feeling of the Office of Endangered Species in Washington, which was consulted on the list. Even though plentiful in numbers, these fish and the bivalve mollusk, *Elliptio waccamawensis,* do not occur outside of Lake Waccamaw. If a toxic chemical or pollutant were accidentally released into the lake, these four species could quickly become extinct, as there are no individuals elsewhere to reestablish them. Dispersal is valuable to a species, and it was felt that the Waccamaw endemics were just as endangered as a species limited in numbers. Their prospects for survival are in immediate jeopardy because they are

found in only this one rigidly defined locality. If this one habitat is changed, they could quickly become extinct even though abundant.

The endangered species lists are being printed in *Wildlife,* as well as in a Department of Natural and Economic Resources publication, in order to stimulate discussion. Constructive criticism is welcomed. Legislation will be introduced next session which will provide for public input into the list. With this action, North Carolina will become one of only a handful of states that has realized the importance of economically unimportant species and taken steps to insure their preservation. In no way does this constitute crying "wolf" as Mr. Louder claims, and I can only wonder if there is any similar legislation pending in his state of Delaware.

If Mr. Louder is really interested in protecting endangered species, he would do better to confine himself to constructive, objective remarks and not criticize species that are not on the list in the first place. Otherwise, he runs the risk of being labeled a "wolf" caller himself.

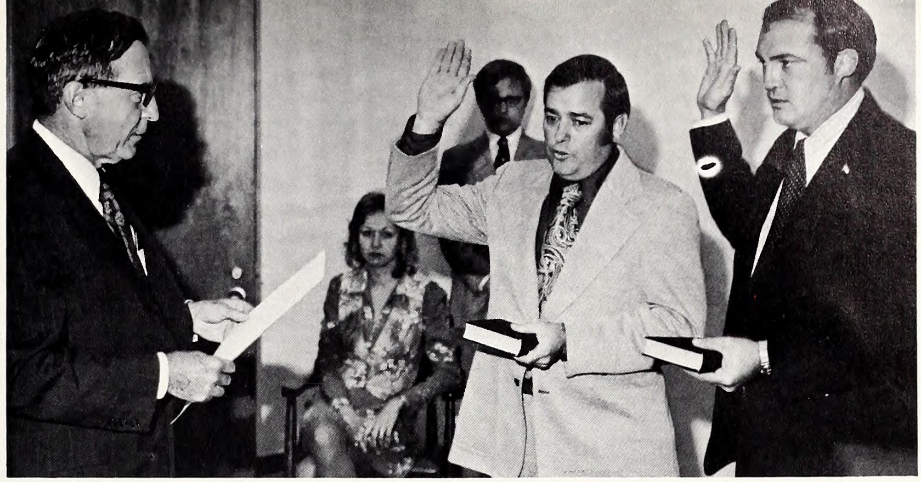
Rowland M. Shelley
Raleigh

New Wildlife Commission Members Appointed

Three new Wildlife Commissioners have been appointed by Governor James E. Holshouser, Jr.

• **Wallace Case,** 37, longtime western North Carolina hunter, fisherman, and conservationist, is a native of Henderson County. He presently owns and operates McGraw Trailer Park, a summer retirement and recreational village in Hendersonville. Case is also employed by USS Agri-Chemical Company and has worked there six years.

He is a graduate of Furman University where he majored in political science and minored in economics.



In the above photo, newly appointed Wildlife Commissioners Wallace Case (center) and V. E. Wilson, III are sworn in by Court of Appeals Judge Frank M. Parker. In the photo at left, Roy A. Huneycutt (right) is sworn in by Joe H. Lowder. Stanly County Clerk of Court.

Case has been active in wildlife conservation for many years and is a Charter Member of the Blueridge Wildlife Club, serving a term as the Club's president. Case also served as a Director of the N. C. Wildlife Federation for two years, was its western Vice President, and was serving as the Federation's Secretary at the time of his appointment to the Wildlife Commission.

He is married to the former Betty McGinnis of Henderson County. The Cases have four children.

Case replaces T. N. Massie of Sylva and will serve as Commissioner for Wildlife District 9.

• **Roy A. Huneycutt,** 56, President of Locust Lumber Company, Inc. and prominent businessman of western Stanly County, is a lifelong resident of Locust. He is a graduate of Stanfield High School and served two years in the Philippines during World War II. He has been in the lumber business since 1947. He is a member of Locust Baptist Church, Locust Lions Club and is a member of both local and general board of directors for Piedmont Bank and Trust Company of Davidson. Mr. Huneycutt is a former Stanly County Commissioner.

He replaces Robert G. Sanders of Charlotte and will serve Wildlife Resources Commission District 6.

• **V. E. (Pete) Wilson III** of Rocky Mount has been active in varied community affairs and is presently a representative of Schering Laboratories. He is a 32nd Degree Mason, a member of Christ Episcopal Church, the Optimist Club, has been active as a Scouter of the Tar River District, and is a member of the Tar Surf Fishing Club and the Bass Anglers Sportsmen's Society.

Wilson attended Clemson University and the Medical College of South Carolina. He is a native of North Carolina and is married to the former Sue Anderson of Asheville. They have two sons, Mark and Joseph, and a daughter, Cynthia.

Wilson replaces Norman Denning of Four Oaks and will serve as Commissioner for Wildlife Commission District 3.

• **Brier Patch from page 22**

Sometimes the briers are so thick that it becomes more of a job to unhook clothes from the undergrowth than it is to walk. But as a rustic old-timer, who was walking by as Nick and I were releasing the beagles for the hunt that day, told me, "You know, son, a rabbit dog in the woods a barkin' and a chasin' a rabbit is pure music to my ears. It just wouldn't feel like home if I couldn't walk outside and hear a pack of those old floppy-eared hounds once in a while."

I was reflecting upon his words as Nick motioned that the dogs were about to jump. A few seconds later, the first beautiful sound of a beagle's bark could be heard just up ahead. Breaking through a maze of briers almost head high, Nick and I spotted the dogs as they put Br'er Rabbit through some motions in his home—the brier patch. ◆

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